KASHWITNA

MANAGEMENT PLAN

APRIL, 1991

DEPARTMENT OF NATURAL RESOURCES, DIVISION OF LAND & WATER

in cooperation with

DEPARTMENT OF FISH & GAME

MATANUSKA-SUSITNA BOROUGH

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This publication was released by the Department of Natural Resources, produced at a cost of $8.34 per copy, and printed in Anchorage, Alaska, for use by state agencies and the public in implementing the Kashwitna Management Plan.

STATE OF ALASKA

DEPARTMENT OF NATURAL RESOURCES

OFFICE OF THE COMMISSIONER

STEVE COWPER, GOVERNOR

P.O. BOX 107005
ANCHORAGE, ALASKA 99510-7005
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The Commissioner of the Department of Natural Resources finds that the Kashwitna Management Plan meets the requirements of AS 38.04.065 and 11 AAC 55.010-.030 for land use plans and hereby adopts the plan. The Department of Natural Resources will manage state lands within the planning area consistent with this plan. The Kashwitna Management Plan amends the Willow Subbasin Area Plan and supersedes the area plan within the Kashwitna Unit.

Rod Swope, Commissioner
DEPARTMENT OF NATURAL RESOURCES

October 24, 1990
Date

The Alaska Department of Fish and Game assisted the Department of Natural Resources in preparing the Kashwitna Management Plan. We appreciate the opportunity to represent fish and wildlife habitat, harvest, and public use values during the development of the plan. The Department of Fish and Game will use the plan as guidance when implementing its authorities and when reviewing and commenting on proposed uses of state lands in the planning area.

Don Collinsworth, Commissioner
DEPARTMENT OF FISH AND GAME

11·15·90
Date

MATANUSKA-SUSITNA BOROUGH

RESOLUTION SERIAL NO. 90-155 AM

A RESOLUTION OF THE ASSEMBLY OF THE MATANUSKA-SUSITNA BOROUGH RECOGNIZING AND SUPPORTING THE KASHWITNA MANAGEMENT PLAN.

WHEREAS, the Matanuska-Susitna Borough Assembly adopted the Willow Subbasin Area Plan by resolution in 1982; and

WHEREAS, the Kashwitna Management Plan amends the Willow Subbasin Area Plan in the Kashwitna, Iron Creek and Little Willow Creek subunits and supersedes the Willow Subbasin Area Plan; and

WHEREAS, the Kashwitna Management Plan directs state land management by the Department of Natural Resources in the Kashwitna area; and

WHEREAS, the Kashwitna Management Plan states that if approved by the Matanuska-Susitna Borough, the plan will also direct management of borough lands within the Kashwitna area; and

WHEREAS, the Borough owns land and has selected lands within the Kashwitna area; and

WHEREAS, a determination has not been made by the State as to whether or not the Borough selections within the Kashwitna area are valid selections; and

WHEREAS, the Borough recognizes the selections within the Kashwitna area as valid selections until such time as both the State and Borough agree otherwise; and

WHEREAS, four major trails have been identified within the Kashwitna area, three of which are partially located on Borough owned or Borough selected lands; and

WHEREAS, the Kashwitna Management Plan specifies that a right-of-way 300 feet in width shall be reserved for the four major trails; and

WHEREAS, the Kashwitna Management Plan further specifies that the Department of Natural Resources will designate the Kashwitna Unit as a special use area for the management of off-road vehicle travel and will work cooperatively with the

Matanuska-Susitna Borough in establishing the special use area.

NOW THEREFORE, BE IT RESOLVED that the Assembly of the Matanuska-Susitna Borough recognizes and supports the Kashwitna Management Plan with the following understanding:

1. Borough selected lands within the Kashwitna area that are determined to be valid selections will be conveyable to the Borough.

2. Rights-of-way for trails crossing Borough lands are not established until specifically approved by the Borough Planning Commission and Assembly.

3. The special use area for the management of off-road vehicle travel will not affect Borough land unless specifically approved by the Borough Planning Commission and Assembly.

4. That in future land management plans, especially the revised Susitna Area Plan, the Department of Natural Resources should clearly identify the lands for disposal and settlement and that the units set aside for disposal and settlement should be located in such a manner so that they are not scattered in holdings that become hindrances to other uses of the land.

Adopted by the Assembly of the Matanuska- Susitna Borough, this 5 day of February, 1991.

Dorothy A. Jones, Borough Mayor

ATTEST:

Linda Dahl, Borough Clerk

(SEAL)

KASHWITNA MANAGEMENT PLAN

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List of Maps and Tables

Acknowledgments

The Kashwitna Management Plan staff would like to thank the following people.

Amy Garrett for her help compiling background information on resources in the unit.

Pearl Reamer, **Debbie Chubin**, and **Rose Bowden** for their help preparing mailing lists and typing text for the plan.

Rich McMahon, Jean Tam, and **Hal Brackett** for GIS map preparation and data analysis.

Matt Graves for his help completing the final plan and preparing the index.

Robin Hall for preparing the plan and maps for publication.

Planning Team, Staff, and Technical Advisors

The Kashwitna Management Plan was prepared by an interagency planning team representing state agencies and the Matanuska-Susitna Borough. The work of the planning team was coordinated by staff from the Land and Resources Section of the DNR Division of Land and Water. Staff from the USDA Soil Conservation Service and the Upper Susitna Soil and Water Conservation District served as technical advisors to the team and staff.

PLANNING TEAM

Department of Natural Resources

Division of Agriculture -- Bonnie Friedman
Division of Forestry -- Jim Eleazer
Division of Land and Water -- Keith Quintavell
Division of Mining -- Mitch Henning
Division of Parks and Outdoor Recreation -- Al Meiners

Department of Fish and Game

Habitat Division -- Steve Albert

Department of Transportation and Public Facilities -- Roger Maggard

Matanuska-Susitna Borough -- John Duffy with assistance from Marcy Martin

TECHNICAL ADVISORS

Department of Fish and Game -- Dmitri Bader, John Westlund

USDA Soil Conservation Service -- Calvin Steele and Tom Ward

Upper Susitna Soil and Water Conservation District -- Art Petersen

PLANNING STAFF

Division of Land and Water -- Martha Welbourn, Project Manager

Chapter 1

Chapter 1

INTRODUCTION

Summary of Purpose

The Kashwitna area is rich in timber, fish, wildlife, agricultural soils, grazing lands, and recreational opportunities. As access to this area expands, a variety of uses are likely to increase rapidly. Some uses may conflict. This management plan directs state land management by the Department of Natural Resources (DNR) in the Kashwitna area. It also directs management of borough lands by the Matanuska-Susitna Borough subject to borough resolution 90-155am (p. ii). The plan identifies road and trail corridors, guides state timber sales and agricultural homestead offerings, and establishes guidelines to minimize conflicts between different resource uses.

This plan amends the Willow Subbasin Area Plan in the Kashwitna Unit. It also amends the Willow plan in the Iron Creek and Little Willow Creek subunits to consolidate agricultural homestead areas and to provide a wider buffer along Little Willow Creek.

This plan does not control uses on private land nor make decisions on fishing and hunting regulations. Fish and wildlife populations are managed by the Department of Fish and Game under rules set by the Board of Fish and the Board of Game.

How this Plan is Organized

Chapter 1 explains the reasons a management plan is needed. It explains the types of decisions made by the plan, describes the area covered by the plan, explains the relationship of the Kashwitna Management Plan to other land use plans, and describes the goals for the planning area.

Chapter 2 describes the resources and current activities in the planning area.

Chapter 3 presents the guidelines for land management that cover the Kashwitna Unit and the three subunits.

Chapter 4 describes how the management plan will be implemented. This chapter includes proposals for research and a recreation study, establishment of rights-of-way and a special use area, and amendments to the Willow Plan.

Appendix A is the glossary for this plan. **Appendix B** lists references cited in the text. **Appendix C** lists mammals likely to be found in the Kashwitna Unit and supplements the habitat summary in Chapter 2. **Appendix D** supplements the grazing guidelines in Chapter 3 with a list of livestock diseases and treatments. **Appendix E** is an amendment to the Willow Subbasin Area Plan made during the Kashwitna planning process.

Planning Area

The Kashwitna Unit covers approximately 36,030 acres, including 29,550 acres of state land, 6,090 acres of borough land, and 390 acres of private land (see Maps 1 and 2). The unit is in the southcentral Matanuska-Susitna Borough, about 10 miles north of Willow and 75 miles from Anchorage. It is bordered on the south by the Willow Creek corridor and the Willow Creek Road. To the north is the Kashwitna River corridor. The Willow Mountain Critical Habitat Area adjoins the east side of the unit. The Parks Highway is about six miles west of the unit.

Most of the area is rolling terrain of 500-1000 foot elevation. A mixture of hardwood forests, black spruce woodlands, and open white spruce forests covers most of the land. Freshwater wetlands are scattered throughout the unit.

Relationship to Other Land Use Plans

WILLOW SUBBASIN AREA PLAN[1]

The Willow Subbasin Area Plan was adopted by the Department of Natural Resources and the Matanuska-Susitna Borough in 1982. The Willow plan covers approximately 750,000 acres of state and borough lands in the southern Matanuska-Susitna Borough. It establishes the primary and secondary uses for these lands and sets general guidelines for managing multiple use.

The Willow plan established three subunits in the Kashwitna area (see Map 2). The primary and secondary designations for these areas are

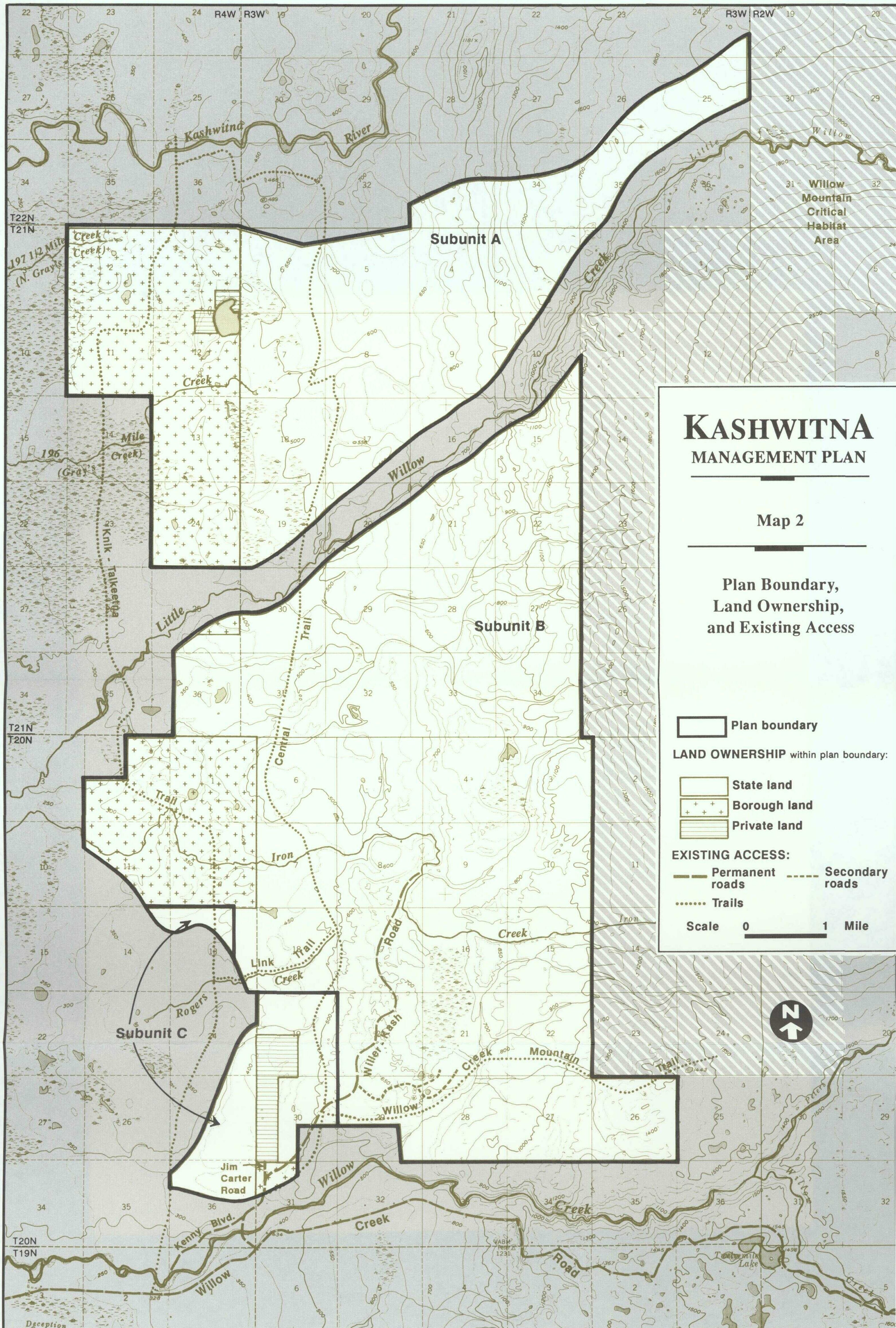
Subunit	*Primary Designations*	*Secondary Designations*
Subunit a	**State land:**	
	Fish and wildlife	Recreation
	Forestry	
	Borough land:	
	Forest management	
Subunit b	**State land:**	
	Fish and wildlife	Grazing
	Forestry	Recreation
	Borough land:	
	Forest managerment	
Subunit c:	**State and Borough land:**	
	Small farm agriculture	Fish and wildlife
		Forestry
		Grazing

[1]The Willow Subbasin Area Plan and the Susitna Area Plan are scheduled for updating beginning in FY90. The update will make the Willow Plan part of the Susitna Area Plan.

KASHWITNA
MANAGEMENT PLAN

Map 1

Location of the Kashwitna Management Plan


KASHWITNA
MANAGEMENT PLAN
Map 2
Plan Boundary, Land Ownership, and Existing Access
Plan boundary
LAND OWNERSHIP within plan boundary:
State land
Borough land
Private land
EXISTING ACCESS:
Permanent roads
Secondary roads
Trails
Scale 0 1 Mile
Subunit A
Subunit B
Subunit C
Willow Mountain Critical Habitat Area
Kashwitna River
Little Willow Creek
Willow Creek
Iron Creek
Link Trail
Central Trail
Knik - Talkeetna Trail
Willow-Kash Road
Willow Mountain Creek
Jim Carter Road
Kenny Blvd.
Rogers Creek
Peters Creek
Deception Creek
197 1/2 Mile Creek (N. Grays Creek)
196 Mile Creek (Grays Creek)
T22N
T21N
T20N
T19N
R4W
R3W
R2W

The Willow plan also stated that "a management plan will be necessary to design roads, schedule timber and farm sales, and develop detailed management guidelines to minimize conflicts among land users." This plan fulfills that requirement and amends the Willow plan within the Kashwitna Unit. After adoption, the plan supersedes the Willow Plan in the Kashwitna Unit. It also proposes an amendment to the agricultural homestead areas in the Iron Creek and Little Willow Creek subunits of the Willow plan.

SUSITNA FORESTRY GUIDELINES

The Susitna Forestry Guidelines provide rules for timber management on state lands throughout the Susitna Valley. Unless otherwise specified in this plan, the Susitna Forestry Guidelines apply to the Kashwitna Unit.

How this Plan Was Developed

PLANNING TEAM

The Kashwitna Management Plan was developed by an interagency team with representatives from

Department of Natural Resources

- Division of Agriculture
- Division of Forestry
- Division of Land and Water
- Division of Mining
- Division of Parks and Outdoor Recreation

Department of Fish and Game

Department of Transportation and Public Facilities

Matanuska-Susitna Borough.

Planning team meetings were coordinated by staff from the DNR Division of Land and Water, Land and Resources Section.

CITIZENS' ADVISORY COMMITTEE

The citizens' advisory committee for the Susitna Forestry Guidelines reviewed draft proposals for Kashwitna guidelines and the agency and public review drafts of the plan. The committee included representatives from about 80 organizations interested in forest management issues in the Susitna Valley.

PUBLIC REVIEW

A public meeting in October 1986 to review proposals for the main north-south Kashwitna Road helped identify issues for the Kashwitna Management Plan. The public review draft of the plan was reviewed by the public at public meetings in Willow, Wasilla-Palmer (Cottonwood Creek), and Anchorage in May 1990. Comments on the draft plan were also received by mail and by phone. The final plan was available for review in September and October 1990.

PLANNING PROCESS

Identify issues. Overall guidance for the management plan came from the Willow Subbasin Area Plan. The planning team identified additional land management issues from a public meeting on a right-of-way permit application for the Kashwitna Road, and other public and agency comments.

Collect information. General resource information was gathered during the Susitna Forestry Guidelines planning process. The Susitna Forestry Guidelines published background reports on timber resources, fish and wildlife, recreation, cultural resources, access and transportation, and land ownership that include information on the Kashwitna area. Additional site-specific information was developed from aerial photography.

Develop agency review draft plan. The planning team developed draft proposals for the Kashwitna area. Proposals were reviewed at a citizens' advisory committee meeting. The planning staff wrote the agency review draft and distributed it for review by the planning team and advisory committee. The plan was then revised and circulated for public review.

Public reviews draft plan. The draft plan was reviewed at public meetings in Willow, Wasilla, and Anchorage in May 1990. Comments were also received by mail and by phone.

Develop final plan. The draft plan was revised following public comment. A summary of changes to the draft plan was sent to the planning team and advisory committee and mailing list. A notice of the intent to adopt the final plan was published, and 30 days allowed for final comment.

Adopt final plan. The final plan was signed by the commissioners of the Department of Natural Resources and the Department of Fish and Game. State land management decisions in the Kashwitna Area must be consistent with the management plan. The Borough Planning Commission and Assembly will review the plan and determine whether or not to adopt it for borough lands.

Who Implements the Plan

The Department of Natural Resources is the land manager for state lands. The Matanuska-Susitna Borough is the land manager for borough lands. The divisions of DNR are responsible for managing state lands according to the plan. The Department of Fish and Game manages fish and wildlife populations on all lands in the planning area. A summary of the main land management responsibilities in this area follows.

DEPARTMENT OF NATURAL RESOURCES (DNR)

Division of Land and Water

Most state land management in the Kashwitna area is the responsibility of the DNR Division of Land and Water (DLW). This division adjudicates requests for grazing permits and leases, agricultural homestead offerings, right-of-way applications, and other authorizations for the surface use of state lands. It will also be responsible for managing the Special Use Area proposed in Chapters 3 and 4. Requests for permits, leases, and other authorizations to use state land should be sent to

Mat-Su Area Office
DNR Division of Land & Water
1830 E. Parks Highway, Suite 116A
Wasilla, AK 99510

Division of Forestry

The Division of Forestry designs, offers, and inspects commercial timber sales and areas open for harvest of wood for personal use. Requests for timber sales or personal use permits should be sent to

Mat-Su Area Office
DNR Division of Forestry
P.O. Box 520455
Big Lake, AK 99652

Division of Mining

The Division of Mining oversees mineral exploration and development on state land. Requests for permits for mining exploration activities and permits to operate on valid state mining claims should be sent to

DNR Division of Mining
P.O. Box 107005
Anchorage, AK 99510

Division of Oil and Gas

The Division of Oil and Gas administers oil and gas leases and related permits on state lands. Requests for oil and gas lease sales or geophysical prospecting permits (seismic testing) should be sent to

DNR Division of Oil and Gas
P.O. Box 107005
Anchorage, AK 99510

DEPARTMENT OF FISH AND GAME (DFG)

The Department of Fish and Game manages fish and wildlife populations. The Board of Fish and the Board of Game set regulations for hunting and fishing. DFG permits are required for activities occurring within the bed or banks of an anadromous waterbody and for any instream activities affecting anadromous waterbodies, such as bridge crossings, bank stabilization, vehicle fordings, and gravel removal. Requests for permits for activities in anadromous waterbodies should be sent to

DFG Habitat Division
333 Raspberry Road
Anchorage, AK 99518

Requests for information on hunting and fishing regulations should be sent to the Wildlife Conservation Division at the same address.

MATANUSKA-SUSITNA BOROUGH

The Matanuska-Susitna Borough manages borough lands in this area. Requests for permits, leases, or other authorizations to use borough lands should be sent to

Matanuska-Susitna Borough
Division of Public Lands
350 E. Dahlia Avenue
Palmer, AK 99645

Goals and Overview of Management Intent

This plan is designed to balance competing interests in state and borough lands in the Kashwitna Unit. It is intended to contribute to statewide goals in a manner appropriate to the resources, economy, and communities of the area. The statewide goals, the strategy of the Kashwitna Management Plan to contribute to those goals, and an overview of management intent follow. See Chapter 3 for a detailed description of management intent and management guidelines.

GOALS

Economic development: Provide jobs and income through the management of state and borough lands and resources to support a vital, self-sustaining local and statewide economy.

> The Kashwitna Management Plan contributes to this goal by providing opportunities for commercial and personal use timber harvest, agricultural development, grazing, and harvest of fish and wildlife, and allowing for mineral development. It also identifies access routes to resources with economic potential.

Public use: Provide diverse opportunities for public use of state and borough lands, such as hunting, fishing, recreation, and firewood collection.

> This plan maintains and enhances opportunities for management of fish and wildlife habitat and populations and recreation. It provides and protects road and trail access routes, buffers important waterbodies and the Willer-Kash Road corridor from timber harvesting and grazing, and sets guidelines to protect and enhance habitat and recreation resources when development occurs. Three recreation sites are identified and a recreation study of Little Willow Creek is required. Some forest lands will supply wood for personal use.

Private land: Provide opportunities for the private ownership of state and borough land.

> Subunit c is designated for agricultural use. Two agricultural homesteads exist in this subunit and eight more are proposed for sale. Agricultural homesteads convey land to private ownership subject to agricultural covenants.

Quality of life: Maintain or enhance the quality of the natural environment and cultural resources, and the character of existing communities.

> The guidelines for this area contribute to the maintenance and enhancement of the natural environment. Guidelines are included to protect or enhance wildlife habitat, water quality, and recreation opportunities. There are no communities in this unit, but this area should contribute recreational and economic opportunities to nearby communities. No known cultural sites exist in this unit, but guidelines are included to protect any sites identified in the future.

Fiscal costs: Minimize the costs of providing necessary government services and facilities, such as state land management programs, schools, and transportation facilities.

> This plan identifies routes to coordinate access to multiple resource values. Some routes will be pioneered by timber contractors and may not need government funding.

Public safety: Protect public safety. For example, avoid development in areas of natural hazards.

No significant natural hazards (for example, avalanches or floods) have been identified in the areas proposed for sale of agricultural rights or resource development. Road guidelines are intended to ensure safe design of new roads.

OVERVIEW OF MANAGEMENT INTENT

The Kashwitna unit is intended for multiple use management emphasizing fish and wildlife habitat and forestry. Land is provided for small farms in Subunit c, and grazing is allowed in subunits b and c. Hiking, snowmobiling, skiing, and other forms of recreation (including hunting and fishing) are encouraged. The unit is currently a heavily used hunting area. It is excellent spring and fall moose habitat and serves as a moose migration corridor between Willow Mountain and the lowlands. The moose habitat value could be improved by using forest management to convert mature hardwood stands into a continuous supply of moose browse. The trails in this unit are important for hunting access and other recreation use.

Grazing is a secondary use in subunits b and c. Grazing could complement the agricultural homesteads in Subunit c and land adjacent to the Kashwitna Unit.

Existing and proposed roads and trails will provide access for forestry, agriculture, grazing, recreation, and habitat management. The plan also identifies proposed routes to borough lands and the Willow Mountain Critical Habitat Area.

All lands in subunits a and b are open for new mineral entry. Subunit c is closed to new mineral entry to avoid conflicts between agricultural development and mining.

Chapter 2

Chapter 2

RESOURCE SUMMARY

Land ownership

There are approximately 36,030 acres in the Kashwitna Unit. About 29,550 acres are state land, 6,090 acres are borough land, and 390 acres are private land (see Map 2). Proposed agricultural homesteads will transfer about 640 acres of state land to private ownership in Subunit c subject to covenants on agricultural use and development (11 AAC 67.154).

Agriculture

DESIGNATIONS AND EXISTING USE

Agriculture for small farms is the primary use in Subunit c. Two 160-acre agricultural homesteads exist in Subunit c (see Map 3) and portions of up to eight more parcels are proposed for sale in or after 1992 (see Chapter 3, Agriculture).

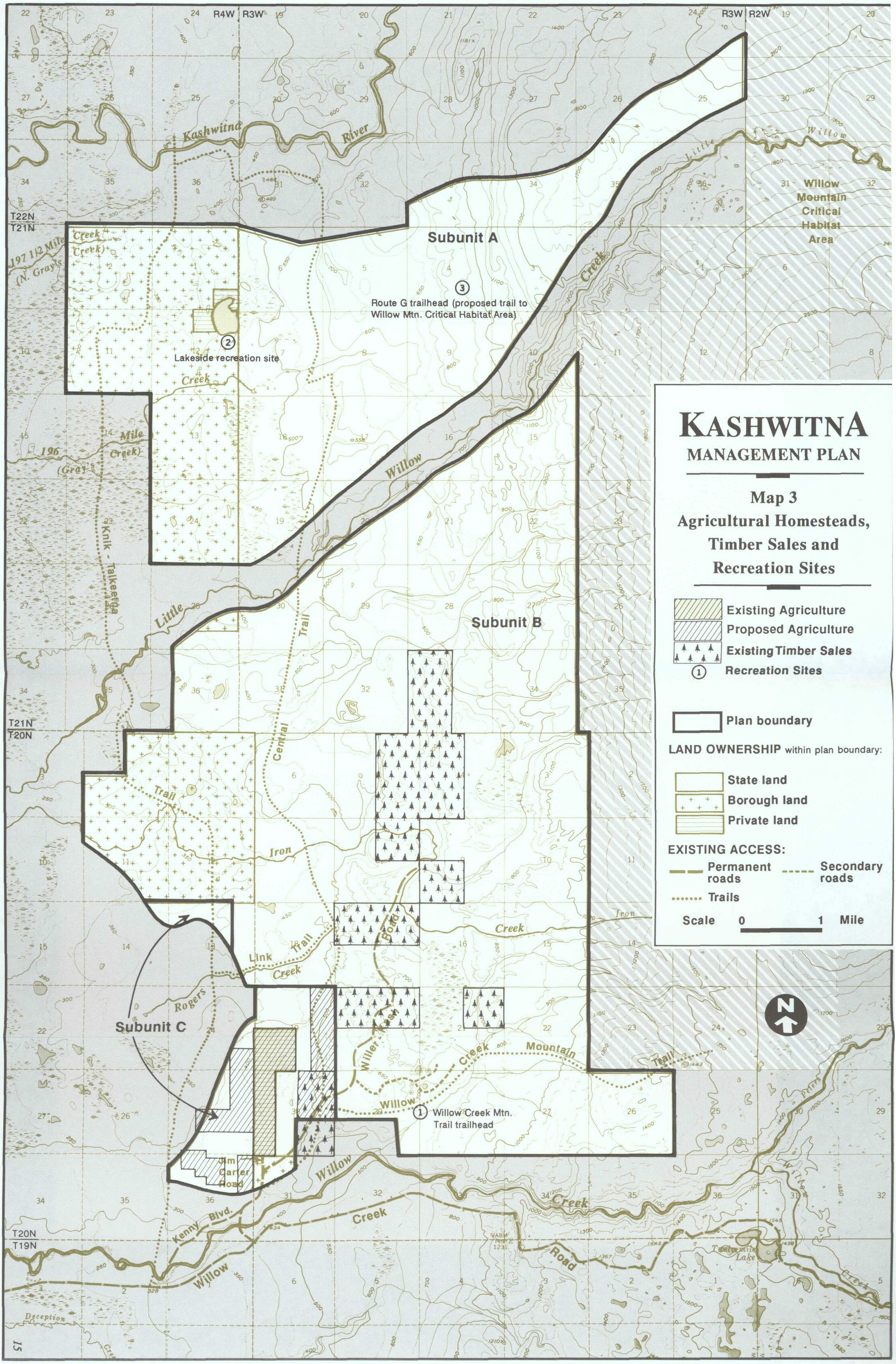
RESOURCES AND POTENTIAL

Detailed soil surveys are available for the parts of the Kashwitna Unit in T21N R4W, T20N R4W, and T20N R3W section 31. Within these areas, which are mostly borough land, about 60% of the soil is rated class III or IV under the current survey, and 40% is rated class V or worse. Less than 1% is rated class II.[1] Class II, III, and IV soils are rated suitable for annual crop production.

Currently, the remainder of the Kashwitna Unit is covered only by the Exploratory Soil Survey. Most of the unit is categorized as association SO1[2] in the statewide Exploratory Soil Survey.[3] The description of this association states:

> In general, the well drained soils on nearly level to rolling uplands are potentially suitable for cultivation or forestry. They have few limitations for roads, structures, and other intensive uses. Many of the other soils, however, have one or more restrictive features, such as a high water table, periodic flooding, steep slopes, poor stability, slow permeability, and stoniness, that severely limit their potential for use.

[1]The USDA Soil Conservation Service is updating soil classifications in this area and expanding the area covered by detailed soil survey. In many areas the new classifications will lower the soil rating.
[2]Association SO1 is "Typic Cryothods, loamy, nearly level to rolling-Sphagnic Borofibrists, nearly level association."
[3]USDA Soil Conservation Service. 1979. Exploratory Soil Survey of Alaska. Anchorage, AK. 213 pp. + maps.


KASHWITNA
MANAGEMENT PLAN
Map 3
Agricultural Homesteads,
Timber Sales and
Recreation Sites
Existing Agriculture
Proposed Agriculture
Existing Timber Sales
1 Recreation Sites
Plan boundary
LAND OWNERSHIP within plan boundary:
State land
Borough land
Private land
EXISTING ACCESS:
Permanent roads
Secondary roads
Trails
Scale 0 1 Mile
N
Subunit A
Subunit B
Subunit C
Route G trailhead (proposed trail to Willow Mtn. Critical Habitat Area)
Lakeside recreation site
Willow Creek Mtn. Trail trailhead
Willow Mountain Critical Habitat Area
R4W
R3W
R2W
T22N
T21N
T20N
T19N
Kashwitna River
Little Willow Creek
Knik - Talkeetna
Central Trail
Iron Creek
Link Trail
Creek
Rogers
Willer Kash Road
Jim Carter Road
Kenny Blvd.
Willow Creek
Mountain Trail
Peters
197 1/2 Mile Creek
(N. Gray's Creek)
196 Mile Creek
(Gray's Creek)
Deception
Twelvemile Lake
VABM Peter 1231
Road

The USDA Soil Conservation Service conducted additional field work in the planning area in 1990. The new data will provide more detailed soil information for the Kashwitna Unit. Maps of this information will be available in 1991.

Fish and Wildlife Habitat

DESIGNATIONS AND EXISTING USE

Fish and wildlife habitat is a primary designation in subunits a and b, and a secondary use in Subunit c. In the last five years, the Kashwitna Unit has become increasingly important for sport hunting for moose. It is adjacent to the Willow Mountain Critical Habitat Area which supports a high-density moose population, there is recently developed access, and the area is close to urban population centers. Increasing use of off-road vehicles adds to the importance of this area. Since 1983 approximately 100 hunters reported spending 520 user-days harvesting an average of 35 moose per year in the Little Willow Creek harvest reporting unit. However, these estimates include lands outside the Kashwitna Unit.

RESOURCES AND POTENTIAL

Moose are widely distributed throughout the Kashwitna Unit, and, because of their great recreational, aesthetic, and subsistence values, are recognized as one of the most economically important species in the planning area. Moose numbers throughout the area vary greatly depending on the season, climatic conditions, and local factors, such as the availability of suitable cover habitat, the quantity and quality of preferred browse species (willow, birch, aspen, and cottonwood), and the diversity and interspersion of important habitat types. In winter, an estimated 250-350 moose inhabit the planning area. The timing and magnitude of winter moose utilization of the Kashwitna Unit probably depends on snow depths in the surrounding area, especially the alpine and subalpine habitats on Willow Mountain.

Most of the planning area is intensively used by moose in the winter. Many moose from the Willow Mountain area retreat to the protected forest cover types in the Kashwitna Unit. Much of the area between Little Willow Creek and the Kashwitna River (Subunit a) is an important concentration area in the fall prior to rut, and in the spring. The riparian habitats along Little Willow Creek are heavily used in the winter and are migration corridors during spring and fall. There is important calving habitat on the margins of wetlands and riparian areas.

The Department of Fish and Game believes this area has high potential for moose habitat enhancement if managed accordingly. Apparently, in the late 1920s, partly as a result of widespread fire, this was some of the most productive moose habitat in the entire Susitna River valley. Movement data from radio-collared moose indicate that in addition to moose coming from Willow Mountain, some moose migrate to this area from seasonal ranges on the west side of the Susitna River. This behavior is thought to represent past movement patterns of a greater segment of the population than at present and reflects a response to the availability of higher quality habitat in previous years.

Black bears are found throughout the planning area but are more closely associated with forests. They favor open to partially-open forests with an understory of fruit-bearing shrubs and herbs, lush grasses, and succulent forbs. Black bears tend to avoid expansive, open areas. The geographical distribution of bears is primarily determined by the availability of preferred food resources. In the spring, upon den emergence, black bears forage on new green vegetation or roots. During moose calving season, bears eat newborn moose or moose

carrion. Bears often forage near salmon streams during the spawning season. In late summer and fall, bears tend to use shrub cover types with berry patches. Important black bear habitat includes riparian habitat along most watercourses, open and semi-open forest types, and pure shrub cover types. Estimated density for black bears in this area is 1 bear/per 3 to 5 square miles (Grauvogel 1989).

Brown (grizzly) bears occur throughout the planning area but are more commonly found at higher elevations and in more remote locations than black bears. Densities are estimated to be 1 bear/20-40 square miles (Grauvogel 1989). Alpine and subalpine habitats are important for summer and fall foraging and denning. In the spring brown bears prefer sedge meadows, grass flats, and south-facing slopes. Their foraging patterns and general behavior are similar to black bears.

Red squirrels occupy mature spruce and mixed forests throughout the Kashwitna Unit. White and black spruce seeds are their most important foods. Mature hardwood forests can provide marginal habitat during periods of emigration or population expansion but generally do not support permanent overwintering populations. ***Northern flying squirrels*** are secretive but usually occur in the same areas as red squirrels.

Hoary marmots can usually be found in low numbers above treeline in the alpine-subalpine habitats of the planning area. Rocky areas are used for shelter and open alpine habitats for foraging.

Arctic ground squirrels are commonly found throughout the alpine-subalpine shrublands, and meadow cover types throughout the planning area where vegetation heights are less than 20 cm (8 inches) so that their vision is not obscured.

Beaver are common in most streams and lakes bordered by hardwood or mixed forest types and low and tall shrub communities in the Kashwitna Unit. Typical beaver habitat has a dependable water supply with minimal seasonal fluctuations in stream flow and a ready supply of willow, aspen, cottonwood, alder, or birch. Present population levels are moderate to high. Beaver colonies accessible by any form of road access probably will be intensively trapped.

Muskrat occur in lower elevation wetland communities throughout the area. Muskrat population levels are low throughout the Kashwitna Unit.

Marten are common residents of the coniferous forest types of the planning area. Current population status is unknown.

Red fox are widespread in the planning area. Densities are low to moderate.

Mink are common along most streams within the Kashwitna Unit. Their population status is unknown, but they are abundant enough to attract moderate trapping pressure.

River otters occur along lowland water courses in moderate numbers. They occur in lower densities in the subalpine portions of the Kashwitna area.

Lynx abundance appears closely associated with the availability of suitable forest and shrub habitat, and the cyclic availability of snowshoe hares, a major prey species. Some lynx inhabit the planning area, but they are uncommon.

Coyotes are commonly found throughout the planning area in most habitat types.

Ermine and ***least weasels*** are distributed throughout the forested and alpine habitats of the planning area and are considered common. Very little is known of their status or ecology in this region.

Wolves have only been rarely documented in the Kashwitna area and would likely involve only single animals.

Wolverine are generally restricted to the foothills of the Talkeetna Mountains. They may only rarely occur in the upper elevation areas in the Kashwitna area. Even where suitable habitat exists, the low density typical of this species would limit their occurrence in the planning area.

Small mammals. Distribution and abundance of small mammals in the Kashwitna area is poorly documented. Appendix C lists those mammal species likely to be found in the Kashwitna Unit based on the availability of suitable habitat and documented range distribution maps.

Snowshoe hares are widely distributed throughout the area but are not abundant. Hares are found in both forested and shrub habitats but prefer early successional stages. Winter habitats containing cover with sufficient browse such as dense black spruce and willow-alder thickets are important during this critical time period. Hares will feed on spruce, willow, alder, and birch. In southcentral Alaska, hare populations follow approximately a 10-year cycle of abundance and scarcity. Because of large population fluctuations, marginal habitat types are more important during periods of high population numbers.

Porcupines are found throughout the boreal forest types of the Kashwitna Unit area.

Birds. Information on the distribution, abundance, and species composition of small birds, upland game birds, and raptors is lacking for the Kashwitna Unit. Birds are probably typical of those in most other parts of the Susitna Basin and Matanuska Valley. See Kessel et al., 1982 and Bronson 1988 for more information.

Fish. The most important anadromous and resident fish in the Kashwitna Unit include chinook, coho, sockeye, pink, and chum salmon; rainbow trout, Dolly Varden char, arctic grayling, whitefish, and burbot.

Little Willow Creek and its tributaries, Iron Creek and its tributaries, 196 Mile Creek (Gray's Creek), and an unnamed tributary of Willow Creek support chinook and coho salmon rearing habitat and Little Willow Creek supports important spawning habitat for chinook, coho, and pink salmon.

Rainbow trout, Arctic grayling, Dolly Varden char, and whitefish occur in Little Willow Creek. Any of these species are likely to occur in the other anadromous streams in the Kashwitna Unit. Because of the remoteness and size of these streams, data describing angler effort and harvest is only available for Little Willow Creek.

Little Willow Creek is one of the more rapidly growing sport fisheries along the Parks Highway corridor. In 1983 only 2,791 angler-days of sport fishing were estimated for Little Willow Creek. This had increased to 10,768 angler-days by 1988. This effort resulted in a harvest of 871 chinook salmon, 1,237 coho salmon, 55 sockeyes, 491 pink salmon, and 546 chum salmon. Most salmon fishing occurs below the Parks Highway, outside the Kashwitna Unit. Above the Parks Highway and in the Kashwitna Unit, resident populations of rainbow trout and grayling and to a lesser extent, whitefish, are caught in significant numbers. These upper reaches of the stream offer a more remote fishing experience.

Forestry

DESIGNATIONS AND EXISTING USE

Forestry is a primary use in subunits a and b and a secondary use in Subunit c. Seven timber sales totalling 2,400 acres were sold between 1986 and 1988 (see Map 3). Harvesting has begun on one 160-acre sale. Harvesting could begin in 1990 on the remaining sales.

RESOURCES AND POTENTIAL

Vegetation types in the Kashwitna Unit are summarized on Map 4 and in Tables 1 and 2. About 48% of the state and borough land (17,130 acres) is forest land on sites with relatively high productivity. These are mixed forests. The most common tree is white birch. Some white spruce is mixed in the birch forest. Approximately 33% of the state and borough land (11,620 acres) are lower-productivity forests on high elevation or poorly drained sites. These include open stands of white spruce and black spruce forests. The remaining 19% of the area (6,890 acres) is shrubland, grassland, tundra, bogs, or water.

Rough volume estimates are available from the average volumes per acre for the Susitna Basin. Based on these figures, state land supports about 10-11 million cubic feet of timber in mixed forests and about three million cubic feet in open white spruce and black spruce forests. Borough land supports about two million cubic feet of timber in mixed forests, and 300 thousand cubic feet in black spruce forests. There are no white spruce forests identified on borough land. These estimates are based on volume in trees 5.0" or greater in diameter at breast height. Volumes for the Kashwitna forests may be higher than the average. The DNR Division of Forestry cruised timber on one existing timber sale and found 1,375 cubic feet per acre. The volume included 1,134 cubic feet per acre of birch and 241 cubic feet per acre of spruce.

The high site forests have the potential to support timber harvesting for commercial and personal use. The primary species in these forests is white birch. The main local demand for birch is for fuelwood. Birch is also used locally for furniture stock and crafts. Foreign markets for hardwood chips and remanufactured wood products are also strong at this time (1990). Changes in markets and technology could make harvesting of low site forests feasible.

Grazing

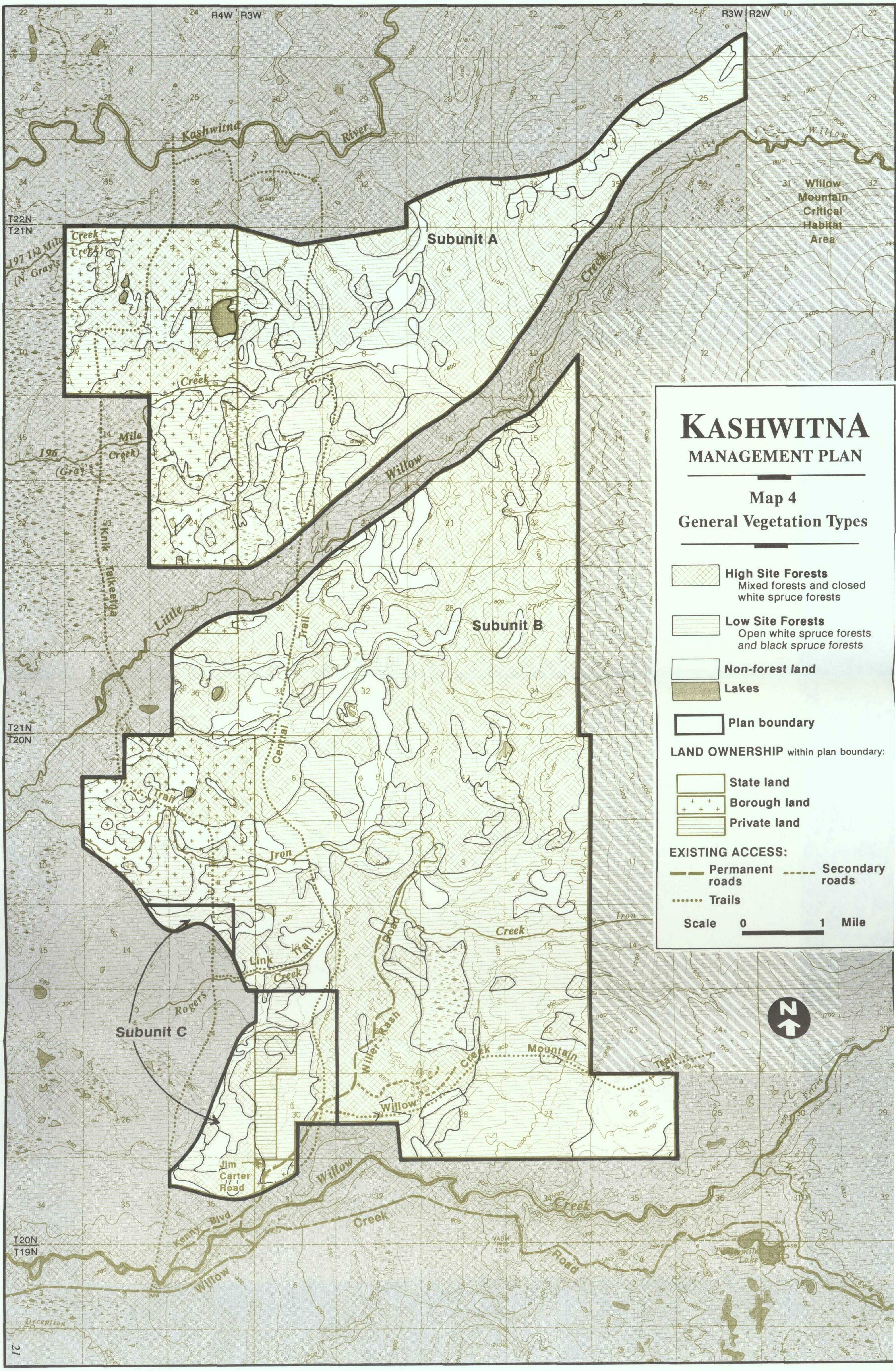
DESIGNATIONS AND EXISTING USE

Grazing is a secondary use on the 23,850 acres of state and borough land in subunits b and c. Grazing is not a designated use in Subunit a. There are currently no grazing leases or permits on state or borough land.

RESOURCES AND POTENTIAL

There is little information on grazing resources in the Kashwitna Unit. General information from the USDA Soil Conservation Service (SCS) vegetation inventory for the Susitna River Basin[4] shows few grasslands in the Kashwitna unit (see Table 1). Only 2% (470 acres) of

[4]US Department of Agriculture in cooperation with Alaska Department of Natural Resources. 1986. Timber and Vegetation Resources of the Susitna River Basin --- Alaska Report. Anchorage, AK. 49 pp. + appendices.


KASHWITNA
MANAGEMENT PLAN
Map 4
General Vegetation Types
High Site Forests
Mixed forests and closed white spruce forests
Low Site Forests
Open white spruce forests and black spruce forests
Non-forest land
Lakes
Plan boundary
LAND OWNERSHIP within plan boundary:
State land
Borough land
Private land
EXISTING ACCESS:
Permanent roads
Secondary roads
Trails
Scale 0 1 Mile
Subunit A
Subunit B
Subunit C
Willow Mountain Critical Habitat Area
Kashwitna River
Little Willow Creek
Willow Creek
Iron Creek
Rogers Creek
Link Trail
Central Trail
Knik Talkeetna
Willow-Kash Road
Mountain Trail
Jim Carter Road
Kenny Blvd.
T22N
T21N
T20N
T19N
R4W R3W
R3W R2W

the state and borough land is subunits b and c is *Calamagrostis* grassland. Grass resources are primarily in the understory of open forests (see Table 3). On the average, the most common grass *(Calamagrostis spp.)* accounts for 1-13% of the canopy cover in forest types that occur in the Kashwitna Unit and up to 30% in non-forest types. *Calamagrostis* also occurred in about three-quarters of the sample plots on these types. These figures are averages for the entire Susitna Basin -- they are not specific to the Kashwitna Unit.

Table 1. Total acreage by vegetation type

Vegetation type	*State Land*	*Borough Land*	*Private Land*	*Total*
Mixed forest	14,310 ac	2,820 ac	190 ac	17,320 ac
Open white spruce	3,490 ac	0	0	3,490 ac
Black spruce	6,740 ac	1,390 ac	200 ac	8,330 ac
Shrubland	2,010 ac	950 ac	---	2,960 ac
Grassland	500 ac	---	---	500 ac
Bogs	2,490 ac	850 ac	---	3,340 ac
Lakes	10 ac	80 ac	---	90 ac
TOTAL	29,550 ac	6,090 ac	390 ac	36,030 ac

Table 2: Acreage of forest land by forest type

This table shows the acreage of state and borough forest land. Forestry is designated one of the primary uses in Subunits a and b. Agriculture is the primary use in Subunit c. See Chapter 3 -- Forestry for guidelines on forest management in Subunit c.

Forest type	*State land Subunits a & b*	*Borough land Subunits a & b*	*State land Subunit c*	*Borough land Subunit c*	*TOTAL*
Mixed forest					
22-closed, young	2,060 ac	80 ac	170 ac	40 ac	2,350 ac
24-closed, medium	5,290 ac	2,110 ac	360 ac	0	7,760 ac
26-closed, old	3,410 ac	20 ac	0	0	3,430 ac
32-open, medium	3,020 ac	570 ac	0	0	3,590 ac
Subtotal	13,780 ac	2,780 ac	530 ac	40 ac	17,130 ac
White spruce					
31-open, short	3,170 ac	0	0	0	3,170 ac
33-open, tall	320 ac	0	0	0	320 ac
Subtotal	3,490 ac	0	0	0	3,490 ac
Black spruce					
41-closed, short	3,940 ac	980 ac	420 ac	0	5,340 ac
42-closed, tall	1,500 ac	0 ac	0	0	1,510 ac
43-open, short	600 ac	340 ac	280 ac	60 ac	1,280 ac
Subtotal	6,040 ac	1,330 ac	700 ac	60 ac	8,130 ac
TOTAL	23,310 ac	4,110 ac	1,230 ac	100 ac	28,750 ac

Based on current resource information, the potential for grazing activity in this area is limited. Proximity to agricultural homesteads in Subunit c and road access raise the potential for use somewhat. Existing and future agricultural homesteads in Subunit c may generate demand for grazing areas.

The SCS is updating and expanding the detailed soil survey to cover the Kashwitna Unit. In 1990, SCS collected additional information on grazing potential in the Kashwitna Unit (see Chapter 4, Research). Data include the current annual production by species of understory and non-forest vegetation and the understory canopy cover. SCS is developing interpretations of soil types for grazing and will describe the range resources in the updated soil survey.

Table 3: Abundance of *Calamagrostis* grass by cover type*

This information shows the extent of *Calamagrostis* grass cover in each vegetation type and how often *Calamagrostis* appeared in sample plots in each type. *Calamagrostis* is the most common grass in this area. This numbers are averages for the entire Susitna Basin -- they are not specific to the Kashwitna Unit.

Cover type	% canopy cover	frequency in plots	average annual production of grasses (lb/ac)
Mixed forest			
22 young, closed	10%	81%	100
24 medium, closed	13%	96%	129
26 old, closed	3%	100%	188
32 medium, open	13%	100%	204
White spruce forest			
31 open, short	10%	75%	320
33 open, tall	3%	83%	126
Black spruce forest			
41 short, closed	2%	70%	116
42 tall, closed	2%	75%	16
43 short, open	1%	29%	93
Non-forest			
61 alder-willow	12%	92%	163
63 *Calamagrostis* grassland	30%	100%	1,333
65 herbaceous tundra	3%	74%	122
68 sphagnum bogs	2%	60%	433
69 sphagnum bog-shrubland	2%	77%	181

*Types 43, 65, and 69 have small amounts (3% cover) of other grass species. Grasses present include *Agrostis sp., Festuca sp.,* and unidentified species.

Source: USDA Soil Conservation Service. 1986. Timber and Vegetation Resources of the Susitna River Basin -- Alaska Report. Anchorage, AK. 49 pp + appendices.

Heritage Resources

There are no known cultural or historic sites in this unit.

Recreation

DESIGNATIONS AND EXISTING USE

Recreation is a secondary use in subunits a and b. Current recreation is mostly associated with hunting (see Fish and Wildlife in this chapter) or snowmachine and other off-road vehicle (ORV) travel. Recreation in the Kashwitna Unit has increased in recent years. Several major ORV trails cross the unit (see also Chapter 3, Transportation and Access). There are no existing commercial or public facilities in this unit.

RESOURCES AND POTENTIAL

High moose populations, increased access, and new access to fisheries in Little Willow Creek are likely to increase hunting, fishing, and trail use in the Kashwitna Unit (see also Fish and Wildlife in this chapter). The unnamed lake in Subunit a has potential for public recreation, including picnicking, sport fishing, camping, and hiking. Use of this lake will depend on provision of access.

Recreation sites are identified on the unnamed lake in Subunit a and at the trailheads to the Willow Creek Mountain trail in Subunit b and the proposed ORV trail in Subunit a (see also Chapter 3, Recreation and Map 3). A recreation analysis is required prior to designing a stream crossing over Little Willow Creek to determine what recreation facilities (for example, parking) are needed at the crossing.

Subsurface Resources

DESIGNATIONS AND EXISTING USE

All public lands in subunits a and b are open to mineral entry and available for leasing for coal, oil, and gas. Subunit c was closed to mineral entry by the Willow Subbasin Area Plan to prevent conflicts with agricultural development. The land added to Subunit c by this plan (the part of Subunit c in T20N R4W sections 13-14) will be closed to new mineral entry before agricultural homesteads are sold.

No active mining claims exist in the Kashwitna Unit. Claims exist east of the planning area on Peters Creek and Purches Creek. There are no existing coal, oil, or gas leases in the planning area.

RESOURCES AND POTENTIAL

Two distinct physiographic regions exist within the Kashwitna Unit: the Talkeetna Mountain foothills and the Susitna Basin lowlands. The foothills are of tertiary conglomerates and coal sequences, plus outliers of a diorite batholith. The tertiary sequence in the foothills shows at

the surface as low hogbacks of sandstone and conglomerate rocks and troughs of softer rocks like coal and fine sediments.

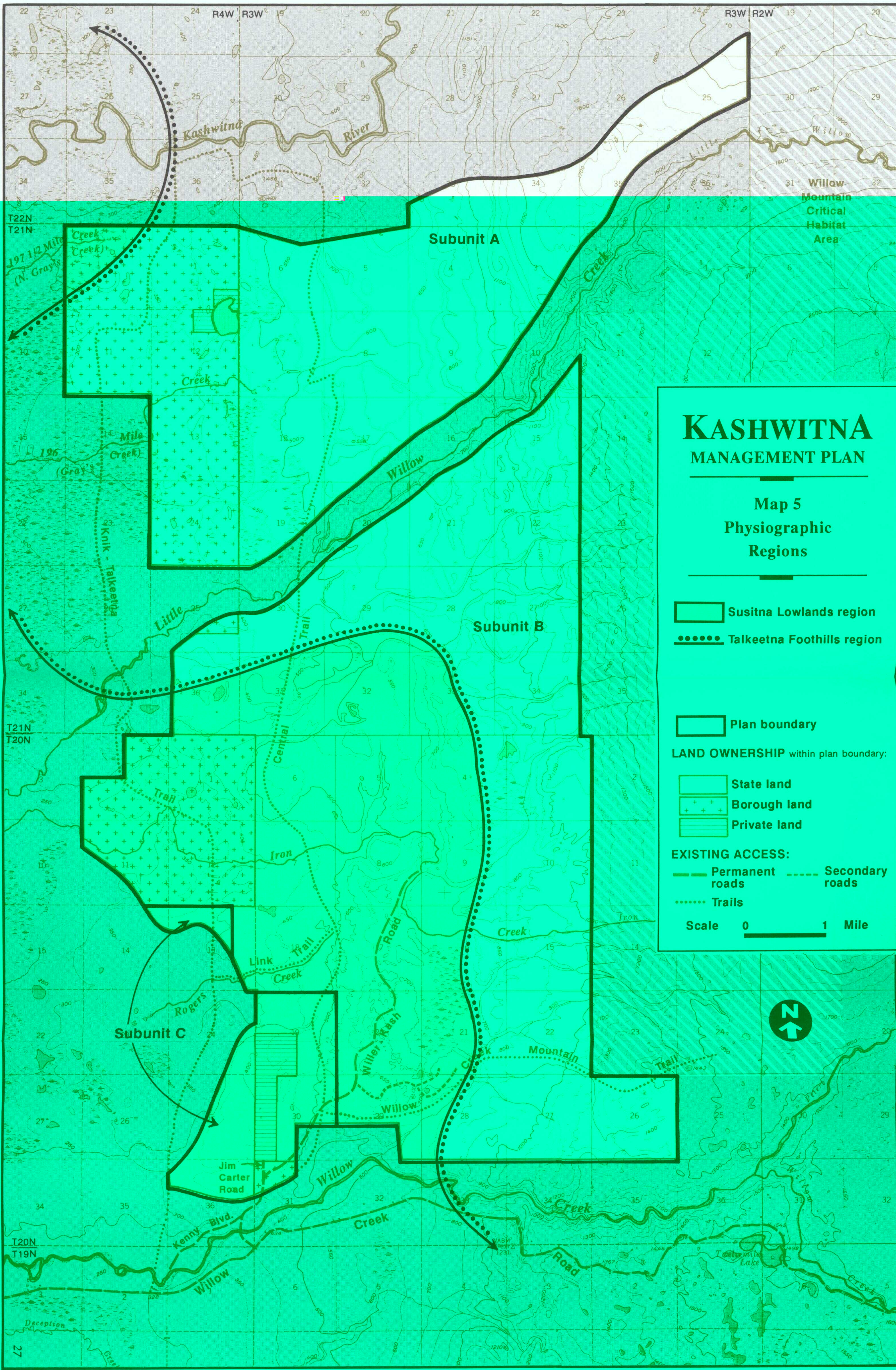
The lowlands have peat deposits over glacial, glacial lake, and glacial river deposits. These deposits overlay the tertiary sequence from the foothills. In general, the Susitna lowlands region contains large reserves of subbituminous and lignite coals within tertiary rocks of the Kenai Group. The bogs contain peat and the conglomerates and sandstones are a source for aggregates and groundwater.

The eastern edge of the Susitna Basin crosses the southwest portion of the planning area (see Map 5). In this area, the Susitna Basin is relatively shallow and Kenai Group strata lie on plutonic rocks of the Talkeetna Batholith. Tertiary exposures are confined to the foothills of the Talkeetna Mountains and isolated, incised stream valleys within the lowlands. The tertiary units are deposited on Mesozoic basement rocks and are covered by Pleistocene glacial, stream, or glacial stream sediments.

It is difficult to estimate mineral potential because of the scarcity of outcrops and subsurface data in the planning area. Kenai coal-bearing sediments occur north and south of the Kashwitna Unit, and by inference are assumed to underlie the southwest portion of the Kashwitna Unit.

Based on existing geologic data, coal resources are thought to be of low potential. As geologic data are upgraded, estimates of potential may change. In the future, areas where Kenai Group coal-bearing sediments occur, coal gasification or other types of gas resources may be developable as a local energy resource.

The DNR Division of Oil and Gas rates the petroleum potential in the Kashwitna Unit low to moderate.


KASHWITNA
MANAGEMENT PLAN
Map 5
Physiographic
Regions
Susitna Lowlands region
Talkeetna Foothills region
Plan boundary
LAND OWNERSHIP within plan boundary:
State land
Borough land
Private land
EXISTING ACCESS:
Permanent roads
Secondary roads
Trails
Scale 0 1 Mile
N
Subunit A
Subunit B
Subunit C
Willow Mountain Critical Habitat Area
Kashwitna River
Little Willow Creek
Willow Creek
Knik - Talkeetna
Central Trail
Iron Creek
Link Trail
Rogers Creek
Willer - Kash Road
Mountain Trail
Jim Carter Road
Kenny Blvd.
Peters Creek
Twelvemile Lake
197 1/2 Mile Creek (N. Gray's Creek)
196 Mile Creek (Gray's Creek)
Deception Creek
R4W R3W
R3W R2W
T22N T21N
T21N T20N
T20N T19N
27

Transportation and Public Access

Existing access routes are summarized in this section and on Map 2. Proposed routes are summarized in the Roads, Trails, and Public Access section of Chapter 3 and on Map 8.

The **Willer-Kash Road** is a permanent, public road that extends north from a bridge across Willow Creek at mile 6.8 on the Willow-Fishhook (Hatcher Pass) Road. As of the publication of this plan, the road was constructed as far as the south bank of Iron Creek in Subunit b. Plans exist to continue construction of this road.

Jim Carter Road is a permanent, year-round road that connects the Willer-Kash Road to a private homestead in Subunit c.

A 1-1/2 mile **temporary road** currently provides access to personal use timber harvesting areas in the southern part of Subunit b. The temporary road branches east from the Willer-Kash Road and splits into two forks after about one mile.

The **Knik-Talkeetna Trail** extends north from the Willow Creek Road through borough lands in subunits a and b. It continues north across the Kashwitna River, past the Caswell subdivision, and on to Talkeetna. It has existed since prior to 1917 and is used for off-road vehicle (ORV) travel.

A **central trail** parallels the Knik-Talkeetna Trail 2-3 miles further east. It extends north from the Willer-Kash Road through subunits c, b, and a and joins the Knik-Talkeetna Trail just south of the Kashwitna River. A short **link trail** also joins the central and Knik-Talkeetna trails just south of Rogers Creek. These routes are used for ORV travel.

The **Willow Creek Mountain Trail** runs east from the Willer-Kash Road through the southern edge of Subunit b. It continues east to junctions with the north-south trails through the Willow Mountain Critical Habitat Area. It is a major ORV trail.

There are no established airstrips in the Kashwitna Unit. The **unnamed lake** in Subunit b (T21N R4W sections 1 and 12) is approximately 1/2-mile long and may provide some access for small planes. There are no reports of landings on this lake.

Chapter 3

Chapter 3

MANAGEMENT INTENT AND GUIDELINES

Management Intent

SUBUNITS a AND b

The lands in subunits a and b supply timber for personal and commercial use, support fish and wildlife habitat and harvest, provide opportunities for public recreation, and provide access to public and private lands.

Forestry and wildlife habitat are the primary uses and classifications on **state land** in subunits a and b. Recreation is a secondary use in both subunits; grazing is a secondary use in Subunit b. (See Map 2 for subunit boundaries). The state land in these subunits will be retained in public ownership and managed to provide timber for commercial and personal use, maintain and enhance moose habitat, and provide opportunities for public use. In Subunit b, guidelines for grazing ensure compatibility with forest and habitat management.

Borough land within these subunits has been classified by the Borough Assembly as Forest Management land. Forest Management lands are presently or potentially valuable for the production of timber and other forest products. They will be managed using the multiple use concept.

The borough owns most of T21N R4W section 25, including some land in Subunit b. To consolidate state and borough lands into blocks that can be managed more efficiently, to decrease the need for additional permanent roads, and to minimize road access to Little Willow Creek, the borough and state will consider exchanging borough land south of the creek in this section for state land elsewhere in the borough. This exchange is subject to AS 29.65.090.

Three public recreation sites are identified in subunits a and b (see Map 3). One is on the largest lake in the Kashwitna unit. The site will ensure public access to the lake, and, if public use increases, provide a place for recreation facilities such as picnic sites, trails, and campsites. The other sites are at the junctions of major trails with the Willer-Kash Road. They will provide off-road parking for trail users.

Additional access is encouraged in subunits a and b to support timber harvesting and provide access to borough lands in the western part of the subunit. A potential off-road vehicle route to the part of the Willow Critical Habitat Area north of Little Willow Creek is also identified.

SUBUNIT c

Small farm agriculture is the primary use in Subunit c and the land is classified for agriculture. Forestry, grazing, and wildlife habitat are secondary uses. To the extent feasible, soils that can support agriculture will be used for agricultural homesteads. Two agricultural homesteads exist in this subunit, and eight more are proposed for sale on state land under 11 AAC 67.154. Land remaining in public ownership will be managed for grazing to supplement on-farm hayland, and for public use, including forestry and wildlife habitat and harvest.

Management Guidelines

AGRICULTURE

Consolidation of agricultural homesteads. The Willow Subbasin Area Plan designated five agricultural homestead areas in the Kashwitna, eastern Little Willow Creek, and Iron Creek units. The Kashwitna Management Plan amends the Willow plan, consolidates the agricultural homesteads lands into one area, and reclassifies the original agricultural areas (See Map 6). The westernmost block of Little Willow Creek subunit b is not affected by this change.

The changes:

- cluster farm parcels to allow more efficient agricultural development,
- locate farm parcels on soil with good agricultural potential,
- decrease the extent of new roads needed,
- provide a consistent, wider habitat and recreation buffer along Little Willow Creek, and
- decrease the amount of farmland adjacent to wetlands.

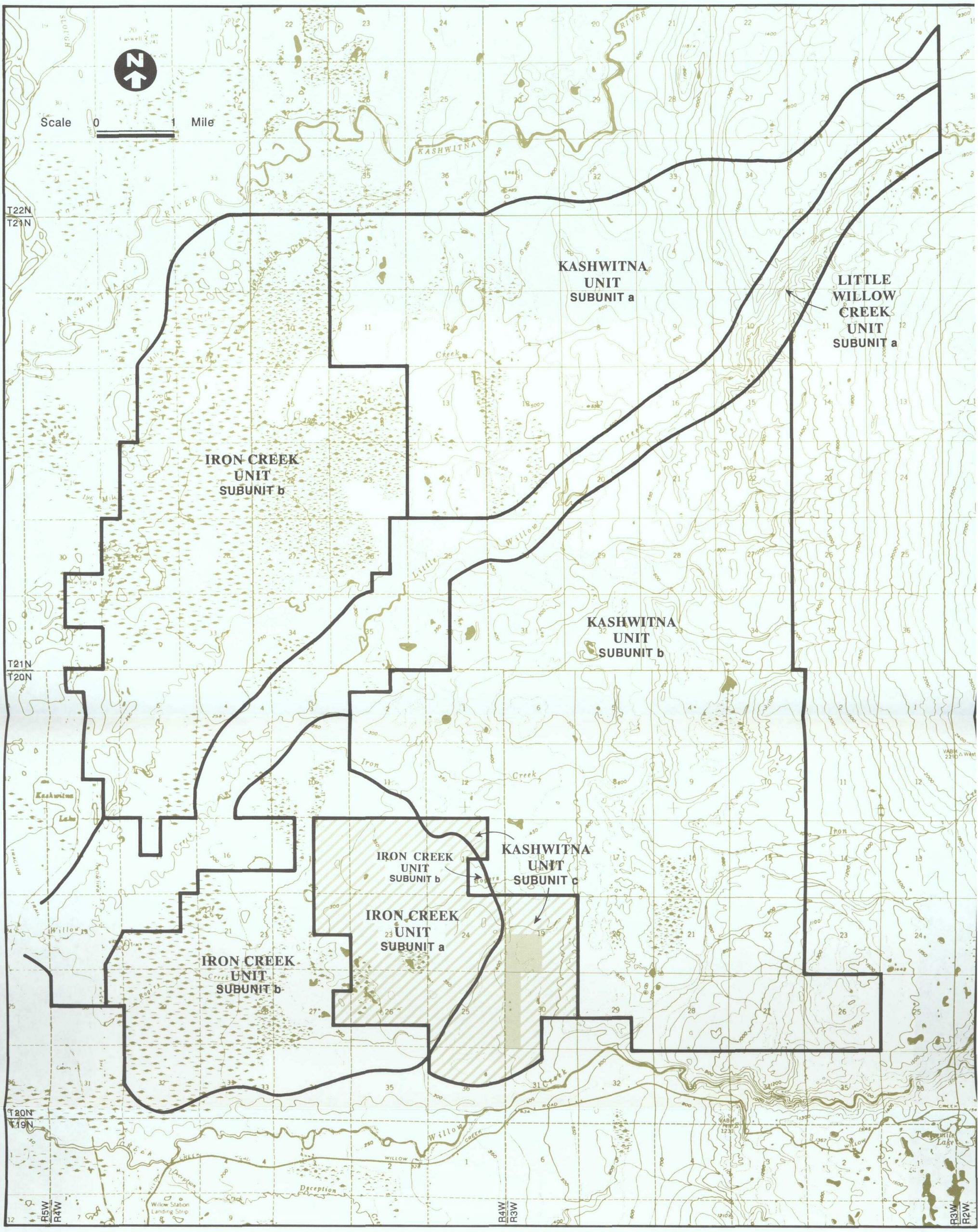
Approximately 1,760 acres are classified for agriculture in Kashwitna Subunit c, and 3,530 acres in Iron Creek Subunit a. In addition, about 320 acres in Subunit c have already been sold as agricultural homesteads.

Agricultural homestead offerings. In the Kashwitna Unit, approximately 640 acres of land will be offered for sale as agricultural homesteads in the southern block of Subunit c during or after 1992 (see Map 6).[1] These sales cover the remaining agricultural land in the southern block. A few additional agricultural homesteads may be offered in the northern block of Subunit c (that part in T20N R4W sections 13 and 14). Land in Subunit c not sold as agricultural homesteads will be retained in public ownership and managed for access and public use.

The proposed 1992 offering includes portions of up to eight parcels that total approximately 640 acres.

Agricultural Homestead Conservation Plan. Agricultural Homestead Conservation Plans are required under 11 AAC 67.155.

[1]Under 11AAC 67.154, sales of agricultural homesteads convey land to private ownership subject to covenants that limit use to agriculture and other activities that support agricultural use.



KASHWITNA
MANAGEMENT PLAN

Map 6
Agricultural Homestead Lands in the Kashwitna and Iron Creek Area

Existing Agricultural Homesteads

Land classified for future Agricultural Homestead offerings

Multiple Use. Individual farms are encouraged to promote ecological diversity and wildlife abundance by retaining vegetation suitable for wildlife food and cover in woodlots, hedgerows between fields, and along roadsides wherever possible. Where possible, woodlots should be situated to increase the effective size of stream and wetland buffers.

Agricultural homesteaders are encouraged to consider regulated public hunting as a potential tool for reducing crop damage by wildlife. The Alaska Department of Fish and Game will provide technical assistance to any agricultural homesteader who wishes to permit regulated public hunting on agricultural lands.

Agricultural Development Adjacent to Wetlands.

1. Class I wetlands (see Appendix A, Glossary) and surrounding buffers should remain in public ownership whenever feasible. A Class I wetland buffer shall include all soils of Class V or worse agricultural capability (for example, Class V, VI, etc.) which lie adjacent to the wetland *or* a 100-foot strip adjacent to the wetland - whichever provides the greatest buffer width. However, maximum buffer width should be 300 feet. Restrictive use covenants and public access easements rather than public ownership may be used to protect Class I wetlands and associated buffers under conditions specified in the Restrictive Use Covenants and Public Access Easements guideline in the Wetlands section of this chapter.
2. Class II wetlands and certain surrounding lands (buffers) should remain in public ownership whenever feasible. A Class II wetland buffer shall include all soils of Class V or worse agricultural capability which lie adjacent to the wetland, *or* a 60-foot strip adjacent to the wetland - whichever provides the greatest buffer width. However, maximum buffer width should be 300 feet. Restrictive use covenants and public access easements rather than public ownership may be used to protect Class II wetlands and associated buffers under conditions specified in the Restrictive Use Covenants and Public Access Easements guideline in the Wetlands section of this chapter.
3. Class III wetlands may be sold as part of the farmstead. Draining, clearing, or other modifications must conform to the applicable permit requirements (for example, Army Corps of Engineers "Section 404" Permit).

Stream Corridors. Agricultural homesteads in the Kashwitna Unit will be designed to exclude anadromous and high value resident fish streams. Based on existing evidence, the streams in subunit c are narrow, traverse mostly wetlands, and have low recreation and fishery values. Agricultural homesteads will require a 75-foot building setback from the ordinary high water mark on streams in subunit c. A public access easement will also be established that extends 50 feet from the ordinary high water mark on these streams. The setback and easement are intended to retain public access to the streams and protect water quality. See also guidelines for Agricultural Development Adjacent to Wetlands in this section.

FISH AND WILDLIFE HABITAT

General. Protection, maintenance, and enhancement of fish and wildlife habitat values shall be an important consideration in managing all public lands, regardless of the dominant land use. Development activities will be conducted in a manner that minimizes negative impacts on fish and wildlife habitat.

Two publications are highly recommended to both public and private land developers for practices that protect and enhance wildlife resources:

> *A Synthesis and Evaluation of Fish and Wildlife Resources Information for the Willow and Talkeetna Sub-basins.* DFG, 1980.

Guidelines for Wildlife Design in Residential Developments. DFG Habitat Protection Section, 1979.

Maintenance of the hydrologic system. The quality of anadromous fish streams of the Kashwitna Unit and of the overall hydrologic system -- lakes, tributaries, wetlands and groundwater - should be preserved at a level which: 1) supports sportfishing effort at current or increased levels of human use; and 2) provides a contribution of salmon to the Cook Inlet commercial salmon fishery equal to the average over the last five years.[2]

Management by general habitat type. The state and borough will strive to protect and enhance the diversity of habitat types occurring in the Willow Sub-basin. Consideration must be given to the overall pattern of lands preserved for fish and wildlife production as well as the qualities of specific sites. Wherever possible, habitat lands shall be linked through migration corridors, river corridors, and buffers.

Life history of species. Land management practices should be designed to minimize impacts on species during critical portions of their life histories, such as moose calving or fish overwintering areas). The borough and state should consult with DFG to develop plans for mitigating impacts during these periods.

FORESTRY

Susitna Forestry Guidelines apply. Susitna Forestry Guidelines will apply to the Kashwitna area. Additional guidelines specific to the Kashwitna Management Plan follow.

Six timber sales have occurred in Subunit b and one in Subunit c (see Map 3):

Sale #	*Size (acres)*	*Length of sale*
1255	320	5 yr (expires 4-13-92)
1310	320	4 yr
1311	320	5 yr
1312	160	4 yr
1314	960	5 yr
1368	160	2 yr
1369	160	2 yr
Total	2,400	

Timber base. The estimated area available for sustained yield timber management is summarized in Tables 4 and 5. On state land, about 11,290 to 11,980 acres of high site forest land and 8,260 to 9,040 acres of low site forest land are available without special conditions. On borough land, about 2,590 to 2,660 acres of high site forest and 1,340 acres of low site forest are available.

The timber base excludes areas where timber harvesting is prohibited or is a conditional use. Timber harvest is prohibited on land within 100 feet of anadromous and high value fish waterbodies, and at trailhead recreation sites, in the Willer-Kash Road buffer, and in the 60' right-of-way that would be cleared along new roads. Rights-of-way would be harvested once, but would not be available for continued management. See guidelines for Harvesting along Waterbodies and Willer-Kash Road management in this section.

[2]Effort is measured in angler-days. Current effort is the mean annual effort from 1985-1990.

Table 4: Estimated timber base on state land in the Kashwitna Unit

Gross Area	*High Site Forest Land*	*Low site Forest Land*	*Total*
State land in subunits a and b and in Subunit c outside agricultural homestead parcels[1]	13,900 acres	10,030 acres	23,930 acres
Prohibited areas			
Within 100' of waterbodies[2]	160-370 acres	200-450 acres	360-820 acres
Trailhead recreation sites (sites # 1 and # 3)	40 acres	0	40 acres
Within 380' of the Willer-Kash Road	760 acres	130 acres	890 acres
Within cleared ROW of roads[3]	140-150 acres	30-50 acres	170-200 acres
TOTAL in prohibited areas	1,100-1,320 acres	360-630 acres	1,460-1,950 acres
Conditional harvest areas			
Within 150' of trails[2]	120-160 acres	160-170 acres	280-330 acres
100'-300' from waterbodies[2]	320-750 acres	400-900 acres	720-1,650 acres
Willer-Kash Road special management zone (170')map 3	380 acres	70 acres	450 acres
Unsold agricultural parcels in subunit c	0-350 acres	0-230 acres	0-580 acres
TOTAL in conditional areas	820-1,640 acres	630-1,370 acres	1,450-3,010 acres
NET AREA (outside prohibited and conditional areas)	**11,290 -11,980 ac**	**8,260-9,040 ac**	**19,550-21,020 ac**

[1]These figures include 130 acres of high site forests and 500 acres of low site forests in subunit c outside of designated agricultural parcels. Forests on these lands will be managed for personal use.

[2]Some streams have not been surveyed to determine whether or not they support anadromous or high value resident fish. If streams are surveyed in the future and do not have these fish, the area near streams where timber harvesting is prohibited will decrease.

[3]Rights-of-way include the 100' right-of-way for the Willer-Kash Road. The range in acreage reflects the alternative routes for Route F. The options for Route F also affect the length of the Willow Creek Mountain Trail affected by the trail buffer guidelines. See the section on Roads, Trails and Public Access -- Route F in this chapter for a description of Route F options.

Table 5: Estimated timber base on borough land in the Kashwitna Unit

Gross Area	*High Site Forest Land*	*Low site Forest Land*	*Total*
Borough land in subunits a and b and in Subunit c outside agricultural homestead parcels	2,820 acres	1,390 acres	4,210 acres
Prohibited areas			
Forest land within 100' of waterbodies[4]	0-20 acres	0	0-20 acres
Forest land within cleared ROW of roads[5]	20 acres	0	20 acres
TOTAL land in prohibited areas	20-40 acres	0	20-40 acres
Conditional harvest areas			
Land within 150' of trails[2]	80 acres	50 acres	130 acres
Land 100'-300' from waterbodies[2]	0-50 acres	0	0-50 acres
Lakeside recreation site (site #2)	60 acres	0	60 acres
TOTAL land in conditional areas	140-190 acres	50 acres	190-240 acres
NET AREA (outside prohibited and conditional areas)	**2,590 -2,660 ac**	**1,340 ac**	**3,930-4,000 ac**

[4]Some streams have not been surveyed to determine whether or not they contain anadromous or high value resident fish. If streams are surveyed in the future and determined not to have these fish, the area near streams where timber harvesting is prohibited will decrease.

[5]Rights-of-way include the 100' right-of-way for the Willer-Kash Road. The range in acreage reflects the alternative routes for Route F. The options for Route F also affect the length of the Willow Creek Mountain Trail affected by the trail buffer guidelines. See the section on Roads, Trails and Public Access -- Route F in this chapter for a description of Route F options.

Based on averages for the Susitna Basin, this area would contain approximately 11-13 million cubic feet of timber and the borough has about 2-2.5 million cubic feet. However, volumes in this area may be higher than the average. Local timber inventory is necessary to accurately determine the volume. (See Chapter 2, Forestry for a discussion of timber volume estimates.)

An additional 1,450-3,010 acres are in conditional harvest areas on state lands and 190-240 acres on borough lands. These areas may be available for sustained yield management, but special guidelines are likely to reduce the amount of timber available. They include land along trails, in the lakeside recreation site in Subunit a, in the special management zone along the Willer-Kash Road, and next to stream buffers. See guidelines for Harvesting along Waterbodies and Willer-Kash Road management in this section, and Recreation Site # 2 in the Recreation section of this chapter.

Active management could increase productivity, which would increase the volume available from this acreage.

In addition to this sustained yield timber base, one-time harvests may be available from land cleared for agricultural homesteads and roadways. Sustained yield timber management on private lands could also contribute a small amount to the timber available.

Timber sale schedule. Additional sales will be held in subunits a and b during or after 1992. New sales will be designed and scheduled through the DNR Division of Forestry five-year timber sale scheduling process. Forest Management Reports will be prepared for each sale. The five-year schedule of timber sales and Forest Management Reports require public and interagency review. Timber sales must appear on the 5-year timber sale schedule for at least two years prior to sale. Scheduling for personal use areas will follow the same scheduling process as commercial sales.

Development of the Forest Industry. Scheduling and type of timber contracts should be designed to aid the growth of a commercial forest industry in the area.

1. The borough and the state will coordinate the schedule for timber sales on state and borough lands.
2. Timber contracts on state land should generally be let through commercial bid sales rather than negotiated sales.

Reforestation. The Forest Practices Act requires regeneration of harvested areas within seven years after harvest. The Susitna Forestry Guidelines direct that site preparation be used to ensure adequate regrowth. These provisions apply to the Kashwitna Unit.

The DNR Division of Forestry's Five-Year Schedule of Timber Sales also proposes replanting up to 75 acres between 1991 and 1995. Replanting would occur on land that has been harvested for personal use timber. Plantings would include lodgepole pine, Scots pine, and Siberian larch. The primary intent of the plantings is research. The plantings will provide information on growth rates and survival of the introduced species, feasibility of growing pines for Christmas trees, and the cost of using plantings for reforestation. This planting program is not intended to convert large areas to exotic tree species.

Joint Forestry/Habitat Management Areas. All the subunits have important forestry and wildlife values. Forest operations will be directed toward the combined goals of forest management, habitat enhancement and recreational opportunity availability. The DNR Division of Forestry will consult with DFG during development of the sale schedule on how to provide opportunities for moose browse enhancement and minimize negative impacts to fish and wildlife populations.

Harvesting along Waterbodies. The Forest Practices Act prohibits timber harvesting within 30 meters (100') of anadromous and high value resident fish waterbodies. It also requires that harvesting 30-90 meters (100-300') from these waterbodies be designed to maintain important fish and wildlife habitat. The Susitna Forestry Guidelines set guidelines for timber harvesting in this 30-90 meter zone.

Harvesting along Little Willow Creek. Vegetation management (including timber harvest) is allowed within 1/4-mile of Little Willow Creek only to maintain or enhance wildlife habitat, recreation, or to prevent or control outbreaks of insects, disease, wildfire, or hazards to public safety. The Department of Fish and Game and the DNR Division of Parks and Outdoor Recreation will be consulted on the design of vegetation management projects in this zone. Vegetation management by DNR will be designed and conducted with due deference to the Department of Fish and Game. Most of this land is within the Little Willow Creek unit of the Willow Subbasin Area Plan, but small areas in Kashwitna subunits a and b are within 1/4-mile of the creek.

Notification of salmon spawning. DOF will notify DFG of the location of spawning salmon seen during field work.

Wetlands. Winter access only should be used in or across wetlands whenever feasible. Timber harvest is allowed adjacent to wetlands, but only single-tree selective timber harvest will generally be permitted within 100 feet of Class I and II wetlands. Other harvesting techniques such as seed-tree harvesting or clearcutting are permitted if necessary to prevent or control outbreaks of insects, disease, wildfire, or hazards to public safety. This guideline may be changed for specific locations by DNR with the consultation of DFG. See Glossary, Appendix A for the Class I and II wetland definition.

Trail Protection. Trail corridors designated in this plan are available for personal and selective commercial timber harvest only if such harvests protect or enhance the visual, sound, and other characteristics of the trail. Harvest practices, timing and transportation must be coordinated with the DNR Division of Parks and Outdoor Recreation. Unless otherwise noted, trail corridors extend 150 feet from trail centerline (300 feet, total width).

Willer-Kash Road management. To provide wildlife cover and protect scenic values along the Willer-Kash Road, a buffer zone and special management zone exist along the road.

A *buffer zone* to provide wildlife cover, provide recreation opportunities, and protect visual quality exists along the road. The buffer extends 380' from the centerline of the road (330' from the edge of the right-of-way). This distance is reserved to provide hiding cover and travel corridors for moose and other wildlife, and to provide visual screening between cutting areas and the road.

Vegetation management (including timber harvest) is allowed within the buffer only to maintain or enhance wildlife habitat, recreation, or visual quality; to clear the right-of-way for transportation and public safety; or to prevent or control outbreaks of insects, disease, wildfire, or hazards to public safety. For example, trees could be cut to open scenic vistas and increase visual diversity along the road. The Department of Fish and Game and the DNR Division of Parks and Outdoor Recreation will be consulted on the design of vegetation management projects in this zone. Vegetation management by DNR will be designed and conducted with due deference to the Department of Fish and Game.

Land adjacent to the buffer is important for additional wildlife cover and public use. A *special management zone* next to the buffer will be managed to provide cover, minimize the attraction of game to the road, minimize displacement of wildlife, and provide diverse recreational settings. This zone extends 170' from the edge of the road buffer. DOF will

design timber harvests in this area in consultation with the Department of Fish and Game and the Division of Parks and Outdoor Recreation.

The buffer zone and special management zone will be reviewed when the plan is updated. In the interim, DFG should monitor the road, the buffer, and the special management zone. The monitoring program should estimate the number of users along the road, determine the amount of hunting along the road, and compare the success rates of hunters along this road with those of hunters in other road-accessible areas.

Harvesting in Subunit c. Small amounts of land will remain public between agricultural homesteads in Subunit c (see Map 6). Timber on these public lands will be available for personal use harvesting only. If any of the proposed agricultural homestead parcels are not sold, larger blocks of land may remain public. Timber on unsold parcels may be harvested for either personal or commercial use.

GRAZING

The guidelines in this section are the Range Management Plan for Kashwitna area.

The goals for grazing in this area are:

1. Use and manage grazing resources in the Kashwitna area on a sustained yield basis as a permanent source of supplementary forage for on-farm hayland and cropland for the dairy and red-meat industry, and for agricultural homesteads.
2. Preserve the integrity of the ecosystem to allow long-term management of forest, habitat, and grazing resources.
3. Minimize conflicts between domestic livestock and wildlife.
4. Manage grazing to be compatible with the primary uses. Forestry and Fish and Wildlife Habitat are the primary uses in Subunit b; Agriculture is the primary use in Subunit c. Grazing is a secondary use in these subunits. Forestry and wildlife habitat are the primary uses in Subunit a. Grazing is not a designated use in this subunit. The guidelines in this section and the grazing operating plan for each permit or lease will be used to ensure that grazing is compatible with the primary uses.

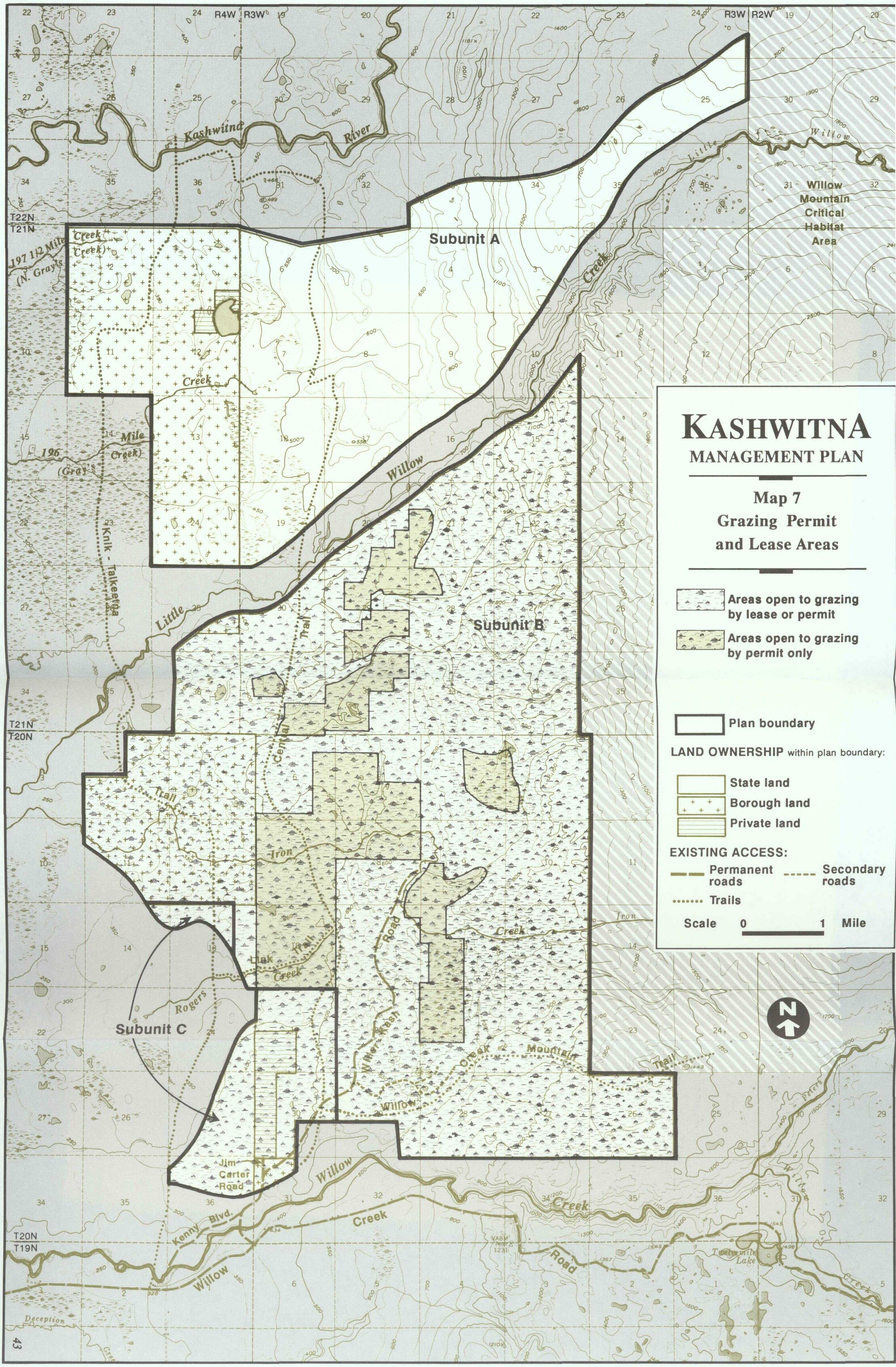
Authorization Requirements

Permit or lease required. All grazing of domestic livestock on state lands shall be authorized by a permit or lease. Permits are not required for incidental grazing use that is generally allowed on state land, such as horse travel.

Compatibility with primary uses. Authorizations for grazing are allowed in subunits b and c only when DNR determines that grazing is compatible with the primary uses.

Permits and leases. Authorizations in Subunit c and in those portions of Subunit b shown on Map 7 may be by permits or leases. Grazing will be authorized only by permit in the remaining areas of Subunit b. Grazing generally supports the agricultural activities planned for Subunit c. Those portions of Subunit b where leasing is allowed are areas where conflicts with habitat and timber management are likely to be less significant based on current information on moose distribution and vegetation type. Permit-only areas are lands where grazing is more likely to conflict with active timber and habitat management, largely closed hardwood and open white spruce forest lands.

Length of authorization. Permits may be issued for up to five years; leases may be issued for up to 10 years.


KASHWITNA
MANAGEMENT PLAN
Map 7
Grazing Permit
and Lease Areas
Areas open to grazing by lease or permit
Areas open to grazing by permit only
Plan boundary
LAND OWNERSHIP within plan boundary:
State land
Borough land
Private land
EXISTING ACCESS:
Permanent roads
Secondary roads
Trails
Scale 0 1 Mile
Subunit A
Subunit B
Subunit C
Willow Mountain Critical Habitat Area
Kashwitna River
Little Willow Creek
Willow Creek
Knik - Talkeetna Trail
Central Trail
Iron Creek
Rogers Creek
Jim Carter Road
Kenny Blvd.
Willow Creek Road
Willow-Kash Road
Willow Creek Mountain Trail
Deception Creek
T22N
T21N
T20N
T19N
R4W
R3W
R2W

Range survey. Prior to DNR issuing a lease or permit, a range survey must be completed by the USDA Soil Conservation Service, University of Alaska, or other recognized range management specialist.

Grazing operating plan. A grazing operating plan is required for each permit or lease. The grazing operating plan will be made part of the grazing lease. Grazing operating plans require approval by the DNR Division of Agriculture and DNR Division of Land and Water. DNR will consult with DFG before approving a grazing operating plan and give due deference to DFG's recommendations directly relating to the impacts on fish and wildlife habitat and harvest.

Termination. Grazing authorizations will be terminated for failure to comply with the terms of the permit, lease, or grazing operating plan. Standard DNR appeal procedures will be followed.

Annual review. DNR and DFG will review grazing operating plans for compliance annually. Grazing authorizations will be modified to mitigate conflicts with management for the primary uses; when conflicts cannot be adequately mitigated through permit or lease stipulations, the authorization will be terminated. Examples of activities that may conflict with grazing are active timber harvest, forest regeneration, and habitat enhancement projects. A one-year notice will be provided prior to termination of a grazing lease for conflict with a primary use. Permits are revocable immediately with cause, and are revocable after 30 days notice without cause under current department policy.

Grazing operating plan process. A grazing operating plan will be completed by the lessee through the following process:

1. Consultation with the USDA Soil Conservation Service. The Soil Conservation Service participates only if a lessee is a district cooperator and requests assistance.
2. Approval by the DNR Division of Agriculture.
3. Approval by the DNR Division of Land and Water with due deference to the Department of Fish and Game.

Required elements. A grazing operating plan for a lease or permit longer than one year will include the elements listed below. Grazing operating plans will be reviewed annually and revised to allow changes in stocking rates, improvements, etc. as indicated by range conditions and trend information.

1. Updated range survey and soils data.
2. Documentation of range condition and trend information, annually.
3. Range conservation practices, including
   - grazing system
   - proper grazing use guidelines
   - stocking rates
   - seasons of use
   - key areas for range readiness and utilization studies
   - non-technical range site descriptions and interpretations for grazing suitability
   - riparian buffers.

Range conservation practices should be developed prior to release of livestock and during a time frame which allows the Soil Conservation Service and the cooperator to examine the potential lease or permit areas during the growing season (May through August).

4. Range improvements and support facilities.
5. Fencing plan.
6. Monitoring system.
7. Location and legal description.
8. Maps
   - range site map
   - soils map
   - range improvements
   - condition and trend maps.
9. Future considerations.
10. Special treatment areas and their fencing requirements where a restrictive grazing policy should be applied will be identified by DFG and DNR during the development of the grazing operating plan.

One-year grazing permits. One-year permits may be issued with a simplified grazing operating plan. The grazing operating plan will be a part of the permit. The grazing operating plan for one-year permits should address the following subjects:

1. Soil Conservation Service range survey data or sufficient on-site range inspection by DNR, DFG, Soil Conservation Service, and the applicant to verify existing range conditions.
2. Range conservation practices, such as
   - grazing system
   - use guidelines
   - stocking rates
   - seasons of use
   - riparian buffers.
3. Range improvements required.
4. Fencing plan.
5. Monitoring system to be used.
6. Location and legal description.
7. Range site map and map of range improvements.

Common use areas. A grazing operating plan is required for common use areas. Common use areas are encouraged to reduce fencing and facility requirements and fully use the grazing resources.

Future leases or permits will be structured to allow common use. Leases and permits will stipulate that the area is not an exclusive use area and that DNR maintains the option to allow other grazing within the lease or permit area in order to use the grass resources. The authorization method will be worked out on a case-by-case basis, but two options are a sublease by the lessee or short-term permits. Where existing leases are in place, lessee cooperation should be pursued to allow stocking of range areas that are underutilized.

Public access. A grazing permittee or lessee shall not restrict public access to state land.

Conservation agreement. If a permittee or lessee unilaterally cancels the Conservation Agreement with the Soil and Water Conservation District, DNR will review the lease or permit and determine whether or not it will be terminated.

Examination for disease. Prior to placing stock on the permit or lease area, all livestock shall be examined by a state licensed large animal veterinarian for the diseases and parasites identified in Appendix D. All livestock shall be free of visible symptoms of any contagious diseases, infectious diseases, and parasites prior to being placed on the grazing area. Livestock carrying an infectious or contagious disease will not be placed on the grazing area for 60-days to allow for treatment and re-testing by a licensed veterinarian.

Parasite treatment. Prior to release on public land, all livestock shall be treated for ectoparasites and endoparasites by using standard treatments and acceptable drugs, and shall be free of ectoparasites and endoparasites.

Notification. DNR shall be formally notified by the permittee or lessee a minimum of 48 hours prior to the release of livestock on state land. The notification shall include the number and type of livestock to be released, and the Doctor of Veterinary Medicine certification that the livestock have been inspected for infectious diseases that are a threat to wildlife.

Renewals. Existing grazing leases or permits may be reissued to the lessee or permittee if the lessee or permittee has fulfilled the requirements of the lease or permit. Should the lessee or permittee forfeit the lease or permit, the grazing privileges may be reissued to another party. The grazing operating plan should be reviewed by DNR, DFG, and the Soil Conservation Service prior to reissue to a new lessee or permittee to determine if changes are needed. A new range conservation plan must be written for a new lessee or permittee. The length of reissued permits will not exceed five years; reissued leases will not exceed ten years.

Range Conservation Practices.

Proper range use. Use of key species (bluejoint and fescues) shall be *limited to no more than 30%* of the annual forage production of those species. This guideline may be modified as a result of range condition and trend studies and utilization checks if those studies or checks prove a higher utilization will benefit forage production without adverse effect on wildlife habitat or forest regeneration. Modification can also be authorized if higher utilization is desired for wildlife habitat enhancement, forest management, or recreation management. Consultation with the DNR Division of Forestry and the Department of Fish and Game is required for modification of the 30% utilization guideline.

Grazing systems. Where season-long grazing occurs, utilization shall be no more than 40% of the forage during any 30-day period. Other systems may be developed as a result of research and used if approved by the DNR Division of Agriculture and Department of Fish and Game. A multiple pasture (rotational) grazing system is generally preferred for long-term lease areas.

Stocking rates. Initial stocking rates for first-generation leases and permits will be determined from existing Soil Conservation Service range survey site productivity data as a general guide. Stocking rates may be modified as a result of changes identified through annual utilization checks or changes in the condition or trend of grazing resources. More than one seasonal check should be made, staff and funding permitting.

Monitoring. DNR or its qualified designee shall monitor grazing operations by conducting timely seasonal grazing resource condition, trend, and utilization surveys to ensure that overgrazing does not occur and that recommended stocking rates and densities are followed. Survey findings shall be reported to the lessee or permittee, DNR Division of Agriculture, DNR Division of Land and Water, and DFG.

If environmental degradation is caused by livestock activities, the grazing operating plan and livestock activities shall be modified to eliminate the undesirable action. Any restoration or rehabilitation needed as a result of overgrazing must be approved by DNR and DFG.

Changes in grazing use. Stocking rates, densities, length of season, and forage utilization levels may change as a result of research activities sanctioned by the DNR divisions of Land and Water and Agriculture, and conducted in cooperation with DFG.

Riparian zones and waterbodies. Riparian zones will be recognized as special treatment areas when developing the grazing operating plan. Riparian zones are lands along anadromous and high value resident fish streams. (See Glossary, Appendix A for definition of anadromous fish streams). The grazing operating plans will identify waterbodies requiring special consideration. These include streams and lakes shown on the USGS 1:63,360 topographic maps.

Riparian buffers and access to certain waters. Livestock shall be prevented from open access to streams and riparian habitat identified by DNR and DFG and noted in the grazing operating plan. Buffers will be established to protect identified riparian zones. The buffers will be at least 100 feet wide on each side of the waterbody above the ordinary high water mark. No grazing will be allowed in these buffers. The grazing operating plan will identify these riparian zones. Livestock may have access to these streams at predesignated fenced watering areas.

Salting. Salting may be used to disperse concentrations of livestock.

Overuse of moose browse. Stock shall be removed from that portion of the management unit where the annual production of moose forage species (willow, aspen, and birch) has been determined by DFG and the Soil Conservation Service to be overused. Overuse occurs if approximately 10% or more of the existing annual growth is consumed above what moose normally consume each year.

Season of use.

Range readiness. Stocking the range shall not occur before bluejoint grass *(Calamagrostis spp.)* is four to eight inches in height. A determination on range readiness shall be made by DNR. Key locations to determine range readiness shall be established where grass growth can be determined. The Soil Conservation Service in cooperation with DNR shall assist in making the determination of how and where these plots shall be established.

Stock removal date. Stock removal dates will be specified in each permit. Generally, all stock shall be removed from the range two weeks prior to moose hunting season or August 31, whichever comes first. However, in some cases, the grazing period and stock removal date may be extended depending on the individual grazing operating plans, current utilization checks, and DFG approval. In some cases, a date earlier than August 31 may be specified.

Wildlife Coordination

Grazing on important habitat lands. Unless DNR determines, in consultation with DFG, that impacts can be mitigated through specific management guidelines, grazing should be prohibited in the following habitat types:

- Dall sheep range
- Brown bear concentration areas
- Habitats of endangered species and species afforded special protection, if such species would be threatened by grazing
- Moose summer and winter concentration areas
- Caribou calving areas
- Other important habitats identified on a case-by-case basis by DNR in consultation with DFG.

Domestic sheep. Domestic sheep shall not be grazed above 1,500 feet in elevation or in the alpine transition zones in or near wild sheep range as determined jointly by DNR and DFG.

Browse species. Browse species will be conserved for primary use by wildlife through selection of areas and season of use guidelines.

Livestock predation. Grazing in known or suspected predator range (wolf or bear) is done at the permittee's or lessee's own risk. DFG will not conduct predator control activities for the purpose of reducing livestock losses from predators. Permittees or lessees must comply with 5 AAC 92.410: Taking Game in Defense of Life or Property.

Range improvements.

Approval. All range improvements must be approved as part of the grazing operating plan and lease agreement.

Facilities. No permanent headquarter facilities capable of human habitation will be authorized as part of a grazing permit or lease. Support facilities such as holding pens, equipment storage buildings, loafing sheds, and livestock treatment facilities shall be specified in the grazing operating plan. All facilities require DNR approval. Facilities shall be located to minimize impact on fish and wildlife habitat and harvest, timber management, and scenic qualities using the following criteria:

1. **Screening.** Facilities will be screened from view of roads, heavily used trails or areas, and public facilities to the extent feasible either by vegetation or natural contours. Location of such facilities must be pre-approved by DNR.
2. **Containment facilities.** Containment facilities will be sufficient to isolate diseased or contagious livestock temporarily, should the need arise. Extended treatment for recovery purposes should occur off the public grazing lease or permit area.
3. **Grouping.** Facilities will be grouped together and kept to the minimum necessary to support grazing operations.
4. **Habitat.** Facilities will not be allowed within stream, lake, or wetland buffers. DFG will be consulted and will have the opportunity to comment on the location of facilities in seasonally important big game habitat, such as calving areas, winter moose range, or habitat enhancement areas. Proposed facilities in important big game habitat will be located in the least sensitive habitat within the designated grazing area.

Fencing plans and guidelines. Fencing plans are required in the grazing operating plan. Fencing plans should be developed after consultation with DFG and DNR during the grazing operating plan development or amendment process. Fencing plans are intended to ensure that all fencing proposals are consistent with the fencing guidelines in this plan and that DNR and DFG review fencing proposals. This does not require that fences be used on all operations.

1. Fencing plans will address the following subjects:
   - Whether or not fencing is proposed
   - Type of fencing
   - Construction specifications
   - Purpose of fencing (for example, confine livestock, exclude livestock, sub-divide grazing land)
   - Location of fencing
   - Fence management

- drop down areas and requirements
- intersections with recreation trails and roads
- maintenance
- permanent nature of fence.

2. Fences shall to the extent feasible and prudent be located and constructed to permit passage by moose through the area while minimizing the potential injury to moose.
3. DFG recommends that barbed wire not be used for wire fences. The fence height and spacing of wire will be such that potential injury to moose is minimized and passage of adults and juveniles is maximized. Specific guidelines for fence height and wire spacing will be developed. One-, two-, or three-wire electrified fencing is acceptable.
4. Fence construction should be designed to allow dropping the fence to the ground, if necessary, at the end of the grazing season in areas of intensive recreational use, established wildlife travel patterns, or areas of heavy snow accumulation.
5. Fence construction will provide for easy passage for people where recreation trails and fences intersect. Foot traffic can be accommodated by pass-throughs or stile construction. Off-road vehicle or snow machine traffic at trail-fence intersections will be accommodated by cattle guards or similar devices to allow safe off-road vehicle passage.
6. Fence lines should be cleared of any obstructions prior to construction to allow the fence to be clearly visible by animals and people. Such clearing will be maintained for the life of the fence.
7. "Poly-tape" or other sight barrier material should be used to make the top wire highly visible.
8. An alternative permanent fencing method for known moose migration routes may be pole fencing. Pole fencing across known moose trails should be tested as an alternative fencing method to wire fencing.
9. All materials used in the construction of fences shall have a minimum life expectancy of the length of the permit or lease.

Effect on wildlife. Fencing will be designed, constructed, and maintained so as to reduce to the extent feasible and prudent the adverse effect on wildlife populations or hunting, trapping, and other recreational use. In selected wildlife or recreational areas, some fences will be removed or dropped to the ground at the end of that season's use. DFG should be consulted on fencing options.

Removal at end of permit or lease. Facilities and fencing will be removed at the end of the grazing permit or lease period if not renewed. The permittee's or lessee's responsibilities for removal will be specified in the permit or lease.

HERITAGE RESOURCES

There are no known heritage resource (cultural or historic resource) sites in the Kashwitna Unit. The following goals and guidelines are intended to ensure that sites will be identified prior to resource development activities, and that identified sites are protected.

Heritage resource identification goals. Identify and determine the significance of all heritage resources on state land in the Kashwitna Unit through

1. Surveys conducted by Department of Natural Resources personnel,
2. Encouraging research about heritage resources on state lands by qualified individuals and organizations, and
3. Cooperative efforts for planned surveys of inventories between state, federal, and local or Native groups.

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2. Encouraging research about heritage resources on state lands by qualified individuals and organizations, and
3. Cooperative efforts for planned surveys or inventories between state, federal, and local or Native groups.

Heritage resource protection. Protect significant heritage resources by

1. Reviewing agricultural homesteads and proposed resource development projects for potential conflict with heritage resources. The Five-year schedule of timber sales will be sent to the DNR Office of History and Archaeology for review.
2. Cooperating with concerned government agencies, statewide or local groups, and individuals to develop guidelines and recommendations for avoiding or mitigating identified or potential conflicts.
3. Where feasible and prudent, conduct site-specific heritage resource surveys or inventories prior to the design of land sales (including agricultural homesteads), timber sales, roads, or other development activities in the areas the DNR Office of History and Archaeology determines have high potential for important heritage sites and for which existing information is inadequate to identify and protect those sites.

Known heritage sites. The Alaska Historic Preservation Act (AS 41.35) governs state management of heritage resources. This Act states, "If DNR determines that historic, prehistoric, or archaeological sites, locations or remains will be adversely affected by the public construction or improvement, the proposed public construction or improvement may not be commenced until the department has performed the necessary investigation, recording and salvage of the site, location or remains. All investigation, recording, and salvage work shall be performed as expeditiously as possible so that no state construction project will be unduly impaired, impeded, or delayed."

Guidelines for protection of known heritage sites will vary. On prehistoric sites where all evidence of prehistoric activity is below ground, guidelines frequently require that timber management activities be conducted in the winter and with no ground disturbance. On historic sites with above-ground evidence of historic use, the DNR Office of History and Archaeology generally will recommend a setback from the site.

MATERIALS

Material sites. To minimize the construction and maintenance cost of transportation, material sites should be located as near as possible to transportation routes, while protecting the fish and wildlife and related recreational resources.

Given the current scarcity of information in the Kashwitna Unit, the DNR Division of Geologic and Geophysical Surveys, and the Department of Transportation and Public Facilities (DOTPF) should inventory and analyze potential gravel sources near proposed transportation corridors when funding is available. The results should be used to locate required material sites. Materials for individual road projects may be identified on the basis of pit location studies along a given route.

The location and extraction of road building material within streams, stream buffers, and trail corridors should occur only after design consultation with DFG, DOTPF, the DNR Division of Parks and Outdoor Recreation, and the DNR Division of Geologic and Geophysical Surveys.

Material sites should be screened from the road, residential areas, recreational areas, and other areas of significant human use. Sufficient land should be allocated to the material site to allow for such screening.

Gravel extraction. Gravel may be used from within the right-of-way along the Willer-Kash Road contingent on restoring the extraction sites to natural appearing contours and vegetation or converting sites into public parking. If gravel sources outside this right-of-way are necessary, a permit must be obtained from the DNR Division of Land and Water.

RECREATION

Recreation sites. Three recreation sites are identified (see Map 3). These sites will be managed for public use to help meet needs for developed recreation facilities such as campgrounds and parking, and to protect public access to trails, streams, and wilderness areas.

Site #1 is on the Willow Creek Mountain Trail in the southern part of Subunit b. It is currently platted as a 40-acre site in T20N R3W section 28 SW1/4 NE1/4. The site is currently undeveloped. The Kashwitna Management Plan recommends that this site be relocated to the junction of the Willow Creek Mountain Trail with the Willer-Kash Road. If the northern route is developed for Route F (see Map 8 in section on Roads, Trails, and Public Access in this chapter), this site would be relocated to the junction with Route F. This site would provide a parking area and trailhead for ORV access to the Willow Mountain Critical Habitat Area.

Site #2 is borough land on the south shore of an unnamed lake in Subunit a, T21N R4W S.M., sections 1 and 12. This is the largest lake in the Kashwitna area. The western and northeastern shores of the lake are in private ownership. As access improves and public use of this area increases, this recreation site will provide opportunities for waterfront public recreation.

Timber harvest in this recreation site shall be for personal use only. Harvests will be managed to protect and enhance the recreational values of the lake and the recreation site. Selective cutting only should be done.

To provide well-drained public access to the lake, the site should include lands on the south and southwest shore of the lake. The state and the borough should consider exchanging these lands to provide a state recreation site on the lake that includes well-drained lakeshore (see also Chapter 4, Land Exchange).

Site #3 is at the trailhead for Route G, the proposed ORV trail to the northern part of the Willow Mountain Critical Habitat Area (see Map 8). The exact site will be located when the trail is designed. The site should be large enough to provide parking off the Willer-Kash Road at the trailhead.

Recreation analysis of Little Willow Creek crossing. The Willer-Kash Road extension (see Route A in Roads, Trails, and Public Access section of this chapter) will cross Little Willow Creek with a permanent bridge. This crossing is likely to increase recreational use of the creek. The creek supports pink, chum, coho, and king salmon, rainbow trout, and grayling. Above the Parks Highway, the creek is currently open for fishing under DFG regulations for all these species except king salmon.

Before final design of the proposed creek crossing, DNR and DFG will determine the potential of the creek for boating and fishing. In particular, DFG will determine what species of resident sport fish are present, and whether the resident fish populations can support a recreational fishery. DNR will determine if the creek near and below the bridge site is usable for floating or motorized boating. This information will be used by DNR to determine parking, picnicking, or other recreational facilities needed near the stream crossing. The study will also consider the pattern of access downstream from the crossing and its likely effect of recreation and fishing along the creek. The crossing should be as close to perpendicular to the creek as is feasible and prudent.

REMOTE CABINS

Remote cabins (AS 38.05.079) are intended for use in areas distant from road access. Because of existing and proposed road access, remote cabin permits are not allowed in the Kashwitna Unit.

ROADS, TRAILS, AND PUBLIC ACCESS

Public access

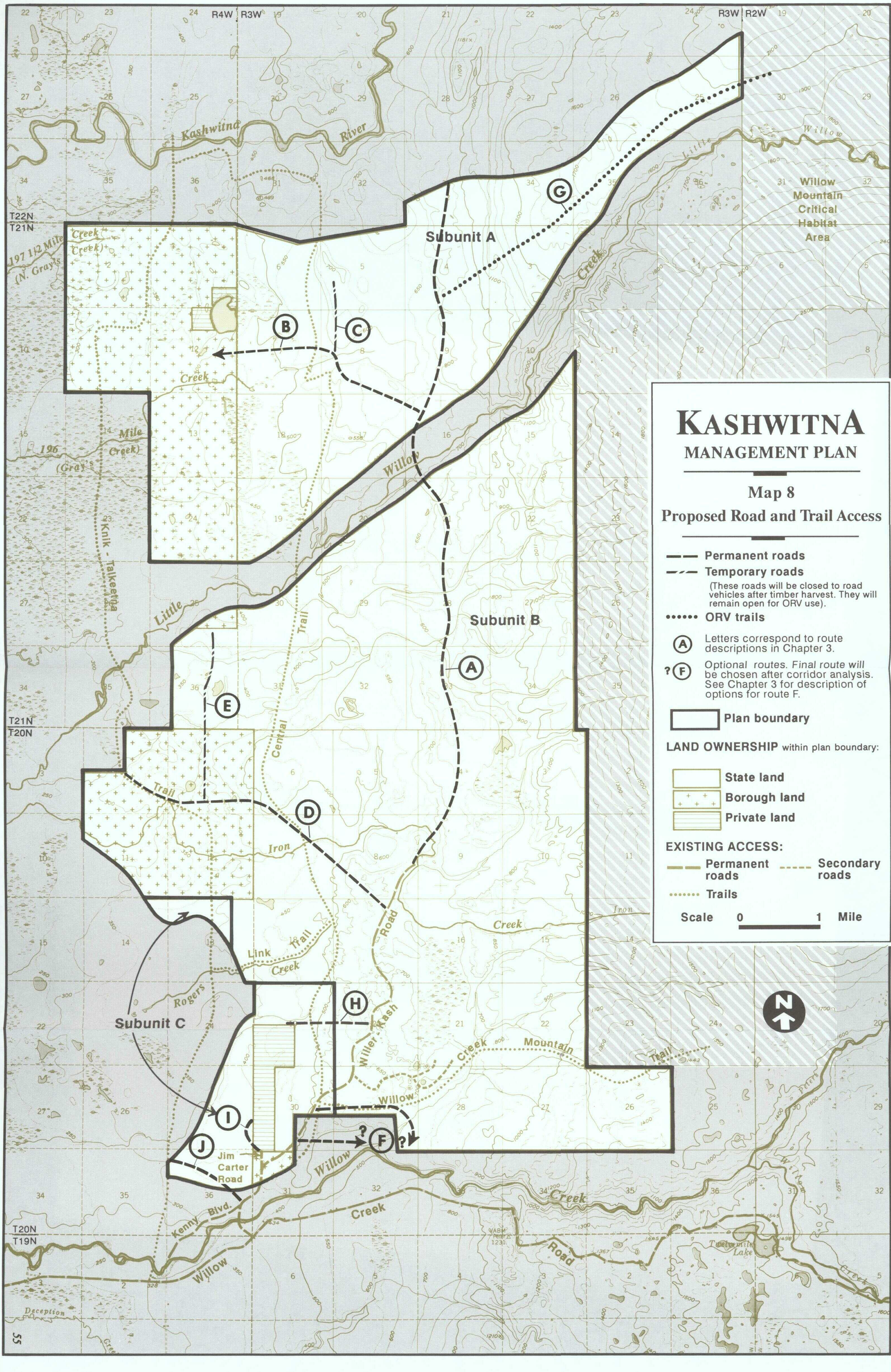
Status of access routes. Existing year-round public roads extend north from the Willow Creek Road into existing homesteads in Subunit c and to Iron Creek in Subunit b (see Map 8). Additional roads and ORV trails proposed by this plan are summarized in this section.

The general route proposed for the Willer-Kash Road will be reserved through a right-of-way. Additional field research will be necessary for detailed design of the final route of the Willer-Kash Road and the location of the other proposed routes. Detailed road layout will be reviewed through interagency and public comment on Forest Management Reports and rights-of-way.

Construction of these routes will depend on funding. Roads could be built by state or borough agencies or by private parties. This plan does not guarantee funding for construction of these roads.

Access to homesteads and developments. Access should be provided prior to agricultural homestead disposal or resource development. This plan provides general recommendations for transportation routes to meet the needs of the various resources. However, much more detailed route alignment and feasibility analysis will be required before the routes can be considered final.

Section line easements will not be vacated unless appropriate substitute access can be located. However, locating realistic substitute access is encouraged. Substitute access can be by trail easement, but in cases where heavy use is expected, access should be through publicly


KASHWITNA
MANAGEMENT PLAN
Map 8
Proposed Road and Trail Access
Permanent roads
Temporary roads
(These roads will be closed to road vehicles after timber harvest. They will remain open for ORV use).
ORV trails
Letters correspond to route descriptions in Chapter 3.
Optional routes. Final route will be chosen after corridor analysis. See Chapter 3 for description of options for route F.
Plan boundary
LAND OWNERSHIP within plan boundary:
State land
Borough land
Private land
EXISTING ACCESS:
Permanent roads
Secondary roads
Trails
Scale 0 1 Mile
Subunit A
Subunit B
Subunit C
Willow Mountain Critical Habitat Area
Kashwitna River
Little Willow Creek
Willow Creek
Knik - Talkeetna Trail
Central Trail
Iron Creek
Link Trail
Rogers Creek
Mountain Trail
Willow - Kash Road
Jim Carter Road
Kenny Blvd.
197 1/2 Mile Creek (N. Grays Creek)
196 Mile Creek (Grays Creek)
Deception Creek
R4W R3W
R3W R2W
T22N T21N
T21N T20N
T20N T19N

owned corridors. Determination of the adequacy of substitute access should involve consultation with the DNR Division of Parks and Outdoor Recreation, DFG, DOT&PF, and the Borough. Approval from DOT&PF, DNR, and the Borough is required to vacate a section line easement.

Access to public resources. Trail and road access to recreation, fish and wildlife, and other public resources should be maintained or improved during agricultural homestead and subsurface development.

Access in mining areas. Access should be designed to minimize the potential for trespass, vandalism, or other public nuisance in mining areas.

Proposed road and trail routes

New routes. This plan recommends construction of a main north-south access road, and subsidiary routes to access borough lands, agricultural homesteads, timber, and the Willow Critical Habitat Area (see Map 8). Access points to the main road should be consolidated and minimized. The new routes in this plan are general corridors only. Detailed design and on-the-ground site review will be needed before actual routes are located.

Route A: (Willer-Kash Road) This is the main north-south route through the Kashwitna Unit. It extends the existing Willer-Kash Road to the northern boundary of Subunit a. It provides access to timber, fish and wildlife habitat, trailheads, and recreation opportunities along Little Willow Creek. It is intended to be a permanent, public access road with a 100-foot right-of-way. Final design of this route will follow the recreation analysis for the Little Willow Creek crossing (see Recreation Analysis of Little Willow Creek in the Recreation section of this chapter).

Route B: Route B provides permanent, public access to borough lands. The route branches west from the Willer-Kash Road, then continues west into the borough lands in Subunit a. It would provide access to borough land and state timber in Subunit a.

Route C: This route branches north from Route B in Subunit a. It provides access from the main road to state timber resources. It is intended to be a temporary secondary road. After timber harvesting is complete, the road will be closed to vehicle traffic and will remain open for off-road vehicle use.

Route D: Route D extends west from the Willer-Kash Road in Subunit b. About one mile would be an upgrade of the existing Knik-Talkeetna off-road vehicle trail and about one mile would be an upgrade of the Central Trail. The remainder of the route would be a new route. Route D would provide access to borough land and state timber in the western part of Subunit b.

Route E: This is a short branch road from Route D north to access state timber resources in the northern part of Subunit b. It will be a temporary, secondary road. After timber harvesting is complete, the road will be closed to road vehicle traffic.

If borough land in T21N R4W section 25 south of Little Willow Creek is not exchanged with the state, Route E may be extended and upgraded to a permanent road to provide access to this borough land. If all borough land south of Little Willow Creek in this section is exchanged for land elsewhere in the borough, Route E will remain a temporary route. It will be put-to-bed after timber harvesting is complete.

Route F options: Route F provides permanent public access to borough lands on the north side of Willow Creek. There are two options for Route F. Only one of these

routes will be built: after the preferred route is chosen, the other will be removed from the map of potential routes.

Upgrading the lower portion of the Willow Creek Mountain Trail for road vehicle travel and adding a spur south from the trail. The trail upgrade would not extend further east than the section line dividing sections 27 and 28, T20N R3W.

Constructing a new route that extends southeast from the Willer-Kash Road between Willow Creek and the Willow Creek Mountain Trail.

The Willow Creek Mountain Trail is a popular route for ORV access to the Willow Critical Habitat Area. If feasible, the preferred road route will not upgrade the existing trail.

Site-specific corridor analysis is necessary before a location is chosen for Route F. Corridor analysis generally includes a detailed review of site and environmental characteristics (for example, soils, wetlands, and slopes), cost, fish and wildlife, the existing and future transportation system, land use, and user origins and destinations. New road construction requires approval by the Borough Planning Commission. The commission's review process for new road construction usually includes a public hearing.

Route G: Route G is a new ORV trail branching east from the Willer-Kash Road in Subunit a. It provides ORV access to the Willow Critical Habitat Area north of Little Willow Creek. The western end of the trail may be used as a temporary secondary road for timber access in the eastern half of Subunit a. When not in active use for timber transport, the timber access road will be put-to-bed and closed to road vehicle use, but will remain available for ORV travel.

Route H: Route H is a short branch road from the Willer-Kash Road west to Subunit c. It provides access to existing and proposed agricultural homesteads. It is intended to be a permanent, public access road.

Route I: Route I is a short continuation of the Jim Carter Road to provide access to agricultural homesteads in Subunit c. It generally follows the section line but will be designed to minimize crossings of wetlands.

Route J: Route J is a spur road that branches northwest from the Willer-Kash Road in the southern part of Subunit c. It will provide access to agricultural homesteads in Subunit c and in the adjacent Iron Creek unit.

Additional roads. Additional spur roads, and possibly secondary roads, will be needed for access to and within timber sales. Design for secondary roads will be reviewed through interagency and public comment on the five-year schedule of timber sales and Forest Management Reports for individual sales, and interagency comment on rights-of-way. Unless otherwise specified in this plan or a Forest Management Report, secondary and spur roads will be put-to-bed. The Susitna Forestry Guidelines on access apply to timber access in the Kashwitna area.

Protection of potential routes. The borough and state should avoid actions incompatible with the construction of potential routes until such time as final decision is made on the feasibility/ appropriateness of the routes.

Coordination with landowners. Alignment of transportation corridors should be coordinated with all public and private agencies with jurisdiction over the affected land and resources.

Rights-of-Way size and permitted uses. The width of major road rights-of-way should be determined on a site-specific basis. However, rights-of-way should be sufficient to accommodate recreation trails within the rights-of-way but not directly adjacent to the road, future road expansion, and the addition of miscellaneous utilities. Minor road rights-of-way should be sufficient to accommodate recreational trails only when the road replaces an existing trail.

The vacant portions of rights-of-way other than the right-of-way for the Willer-Kash Road should be used for selective timber harvest or leased for agricultural purposes if such uses do not create hazards or impair necessary visual screening. (See guideline on Willer-Kash Road Management in the Forestry section of this chapter.)

Timber salvage from the right-of-way. All timber having high value for commercial and personal use will be salvaged on rights-of-way to be cleared for construction.

Roads.

Roads near Little Willow Creek. Roads will not be located parallel to Little Willow Creek within 1/2-mile of the creek to minimize adverse impacts on riparian habitat and public recreation along the creek.

Public use of roads. Roads proposed in this plan will be available for public use except during spring break-up or other conditions when the roadbed would be damaged by vehicle traffic or when necessary to protect public safety, sensitive wildlife populations, or other public resources along the road. [**Note**: Regulations for road closure are currently being developed by DNR. When adopted, they will guide road closure decisions statewide, including closures in the Kashwitna area. Public notice is required prior to adoption of regulations.]

Road design. Along permanent roads, adequate pullouts will be provided for public safety and passage of 2-way traffic, including off-highway parking where necessary. When one-lane roadways with two-directional traffic are designed, turnouts for passing should be provided. Traffic convenience requires that such turnouts be intervisible, provided on blind curves, and no more than 1000 feet apart. Where road corridors contact streams, habitat corridors or other areas of expected recreational usage, sufficient acreage should be retained in public ownership to accommodate public access, safety requirements, and expected recreational use.

Interagency consultation. The lead agency for road construction will consult the DNR Division of Parks and Outdoor Recreation and the Department of Fish and Game on design of pullouts and parking areas along permanent roads. During the design of roads, DFG will provide recommendations on road alignment to avoid wetlands and sensitive wildlife habitats. The size and location of pullouts should be determined in consultation with the DNR Division of Parks and Outdoor Recreation and DFG.

Location of spur roads. The DNR Division of Forestry will identify spur roads in Forest Management Reports. DFG and the DNR Division of Parks and Outdoor Recreation will evaluate proposed spurs case-by-case, provide comments on spur location and on needs for trails that could be provided by spur roads built under logging contracts. Spur roads outside existing rights-of-way may require additional right-of-way permits or land use permits if spur roads are intended for permanent road or trail use. If spurs are intended for winter use only, additional right-of-way permits may not be necessary.

Check dams. Check dams should be considered in steep portions of permanent roads to minimize erosion and runoff from the road.

Road clearing. Clearing methods shall prevent trees and brush from being mixed with dirt to form undesirable berms.

Road surveys. The agency or individual constructing a permanent road will provide an as-built survey to the DNR Division of Land and Water following construction.

Protection of the hydrologic system. Transportation corridors should be located to avoid influencing the quality or quantity of water in adjacent streams or lakes, and avoid detracting from recreational use of the waterway. General guidelines for road development follow. [Note: Regulations in 11 AAC 95.110 also govern development of timber access.]

1. Minimize stream crossings - especially anadromous fish streams.
2. Wherever possible, avoid routing roads parallel to and within 100 feet of any waterway or parallel to and directly upslope from any waterway.
3. Leave sufficient space on either side of roads for buffers when routing near streams and wetlands. Buffers will vary with the degree of potential erosion hazard, but all buffers should be at least 100 feet. Where existing buffers lack sufficient protective vegetation, more effective vegetation should be planted.
4. When it is absolutely necessary to cross a water way, position the crossing as nearly as possible at a 90° angle, or perpendicular to the water channel.
5. Road crossings of streams must provide for fish passage consistent with AS 16.05.840. Bridges are the preferred type of stream crossing. All water crossings (bridges and culverts) should be large enough and positioned to avoid: 1) changing direction and velocity of stream flow, and (2) interference with migrating or spawning activities of fish and wildlife. In addition, all bridges and culverts on permanent roads should be large enough to accommodate the 50-year peak discharge without interfering with volume, velocity and sediment transport or substrate characteristics of the stream. Bridges should provide adequate clearance for boat, pedestrian, horseback, and large game passage whenever these uses occur or are anticipated.
6. Construction or construction activities should not encroach upon streams.
7. Road drainage should not be discharged directly over the edges of the streambanks. Diverted flows from road gutters should be provided with adequate outlets.
8. Vegetative cover along streambanks should be encouraged, so long as it does not restrict channel capacities.
9. When routing through wetlands or peat, culverts should be installed to enable free movement of substances such as fluids, mineral salts, and nutrients.
10. Construction should be confined, whenever possible, to level, well-drained areas. In potential problem areas, excavation and soil disturbance should be minimized.
11. Routing should be avoided in severe hazard erosion areas (steep slopes) - especially those directly above or adjacent to wetlands or water ways.
12. When it is necessary to route through erosion hazard areas (primarily slopes greater than 12%), runoff, erosion, and sedimentation should be minimized by methods such as vegetative coverings, surface roughening, and diversion dikes.
13. Construction should be minimized in poorly drained areas - particularly lowlands and peat. Construction should be minimized in areas of sandy or gravelly soils where the seasonal water table comes within a maximum of four feet of the surface and in areas of silty soils where the water table comes within a maximum of three feet from the surface.

Trails.

Recreation and historic trails: Trails identified in this plan shall be retained in public ownership with a width of 300 feet (150 feet either side of centerline) on state land. This distance may be modified on a case-by-case basis with approval of the DNR Division of Parks and Outdoor Recreation and the Matanuska-Susitna Borough Trails Committee. This width allows flexibility to re-route the trail, separate motorized and non-motorized uses, and include a visual buffer. Re-routing the trail corridor may be permitted to minimize land use conflicts if alternate routes provide opportunities similar to the original. Re-routing trails on public land requires consultation with the Matanuska-Susitna Borough Trails Committee, the DNR Division of Parks and Outdoor Recreation, and DFG. On borough land, the Matanuska-Susitna Borough Planning Commission and Assembly determine the width of rights-of-ways for trails.

Identified trails. Trail corridors are established by this plan along the following trails (see Map 8):

- Knik-Talkeetna Trail
- Central Trail
- Link trail from Knik-Talkeetna Trail to Central Trail
- Willow Creek Mountain Trail.

Land management of trail corridors. Where necessary for powerlines, pipelines, or roads to cross trail corridors, crossings should be at 90° angles when feasible. An exception is when a trail corridor is deliberately combined with a public facility or transportation corridor. Land uses immediately adjacent to the trail corridor should not adversely affect the recreational enjoyment of the trail. Examples of negative effects are trees blown down within the corridor caused by removal of protective trees on adjacent land; pollution of streams that flow across or along the corridor caused by agricultural, industrial, resource extractive or residential development; and uncomfortable noise, light, dust, smoke, or odor levels adjacent to the trail corridor.

ORV management and special use area. A rapid increase in ORV use of the Kashwitna Unit is expected to follow improved access. To prevent damage to wetlands, streambanks, and other areas with poorly drained soils, prevent erosion and wildlife disturbance or displacement, and provide access to public lands, DNR will establish the Kashwitna Unit as a special use area under 11 AAC 96.010. The special use area will be established after mapping existing trails and analyzing trail use (see Special Use Area, Chapter 4). Public notice is required before a special use area is established. The following guidelines will apply in the special use area. These guidelines will not be enforced until the special use area is established. The special use area will not apply to borough land unless specifically approved by the Matanuska-Susitna Borough Planning Commission and Assembly.

1. DNR, in cooperation with DFG and the Matanuska-Susitna Borough, will map trails in the Kashwitna Unit and designate certain trails for ORV use. ORV trails will be designated based on their ability to support year-round ORV use without damage to public resources and on the need for public access.
2. Off-road vehicle use is allowed throughout the Kashwitna Special Use Area when snow cover is sufficient to prevent damage to surface vegetation. The general standard for adequate ground protection from vehicle damage will be one foot of snow and one foot of frost. This standard may be varied to allow for variation in winter conditions. For example, deep snow may prevent freezing but provide adequate ground protection. If the ground is not frozen to a depth of at least one foot, addi-

tional snow depth is required before winter ORV travel can occur.[3] In addition, "dozers, sleighs, tracked vehicles, and rubber tired equipment" must comply with the statewide Coastal Management Program guidelines for cross-country travel during winter.

3. When snow cover is not sufficient to prevent damage to surface vegetation, off-road vehicle use is allowed only on designated ORV trails or by permit. Permits are intended to allow access for commercial mining only. Permits for off-road access will be issued for access to active mining claims to carry out mining operations authorized by a miscellaneous land use permit or an approved plan of operations.

In the event the above guidelines fail to control significant damage to surface vegetation, soil erosion, or fish and wildlife habitat, one or more of the following restrictions may be applied: 1) bridging or active trail maintenance to curb damage, 2) trail relocation, 3) prohibition of specific vehicle types, 4) temporary or permanent trail closures, 5) trail designations for specific uses, or 6) authorization of ORV use by permit only.

Maintenance of roads used as ORV trails. Secondary timber access roads that are not identified as permanent roads will be closed to vehicle traffic after timber harvest, but will remain available for use as ORV trails. These roads require berms, cables, gates or other methods to restrict vehicle access to the road. Roads remaining open for ORV use should follow well-drained routes wherever possible. Drainage structures should be inspected and maintained as long as the roads are open to ORV use. Inspection schedules will depend on funding for field work. If organic soil is removed during construction, exposed gravel or mineral soil may be left on the surface to support ORV use rather than replacing the overburden.

WATERBODIES

Guidelines for management of lands along streams and lakeshores in the Susitna Regional Forest Plan and Forest Practices Act apply to the Kashwitna area. These guidelines prohibit timber harvesting within 100' (30m) of anadromous and high value resident fish waterbodies, and require that timber harvesting between 100' and 300' (30m and 90m) from these waterbodies be consistent with the maintenance of important fish and wildlife habitat. See Map 9 for the waterbody locations.

See also the following guidelines in this chapter for protection and management of waterbodies.

Agriculture -- Stream corridors

Fish and Wildlife Habitat -- Maintenance of the hydrologic system

Forestry -- Harvesting along waterbodies, Harvesting along Little Willow Creek, and Notification of Salmon Spawning

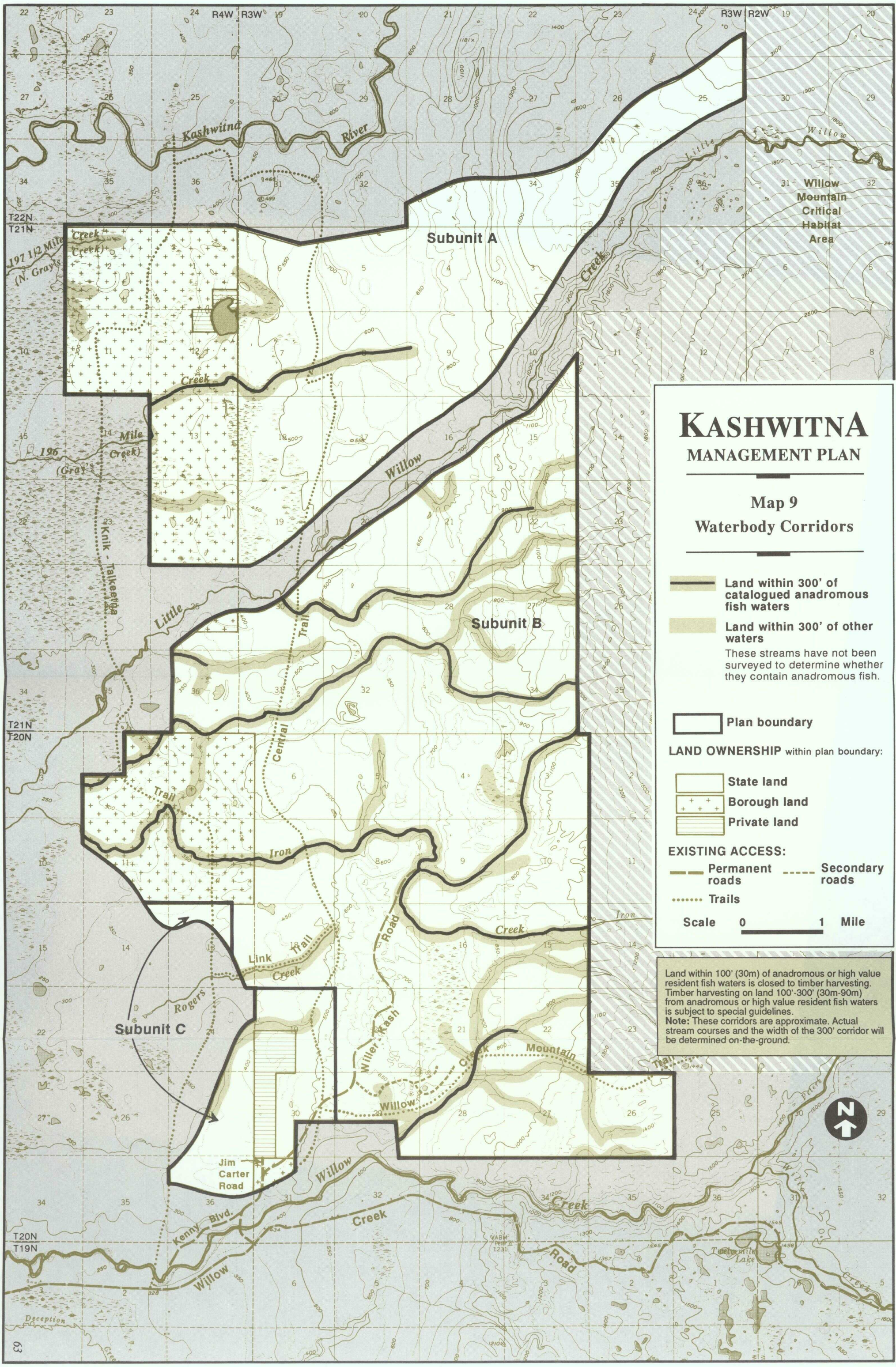
Grazing -- Riparian zones and waterbodies, Riparian buffers and access to certain waters

Materials -- Material sites

Recreation -- Recreation analysis of Little Willow Creek crossing

Roads, Trails, and Public Access -- Roads near Little Willow Creek, Protection of the Hydrologic System

[3]Daily information on accumulated snow depth is collected at the weather station in Willow and is available from the National Weather Service.



KASHWITNA
MANAGEMENT PLAN

Map 9
Waterbody Corridors

Land within 300' of catalogued anadromous fish waters

Land within 300' of other waters

These streams have not been surveyed to determine whether they contain anadromous fish.

Plan boundary

LAND OWNERSHIP within plan boundary:

- **State land**
- **Borough land**
- **Private land**

EXISTING ACCESS:

- **Permanent roads**
- **Secondary roads**
- **Trails**

Land within 100' (30m) of anadromous or high value resident fish waters is closed to timber harvesting. Timber harvesting on land 100'-300' (30m-90m) from anadromous or high value resident fish waters is subject to special guidelines.
Note: These corridors are approximate. Actual stream courses and the width of the 300' corridor will be determined on-the-ground.

SUBSURFACE RESOURCES

Lands open and closed to mining. All lands in Subunit a and b are open to mining and to coal, oil, and gas leasing. Subunit c was closed to mineral location under the Willow Subbasin Area Plan. It remains closed to prevent conflicts with agricultural development. The new addition to Subunit c in T20N R4W sections 13 and 14 will be closed to new mineral entry prior to sale of agricultural homesteads.

Mineral leasing. All lands in the Kashwitna Unit are available for leasing for coal, oil, and gas. The requirements of the state Five-Year Oil and Gas Leasing Program apply to the Kashwitna Unit.

Coal prospecting. Nearly all public lands are available for coal prospecting. Certain areas with exceptionally high surface resource values are closed to the issuance of coal prospecting permits under the Willow Subbasin Area Plan. The affected sites in the Kashwitna Unit are the recreation sites on the unnamed lake in Subunit a and the Willow Creek Mountain Trail in Subunit b. These sites are for campgrounds, trailheads, boat launches, and access sites on water bodies. [Note: Land within 300 feet of Little Willow Creek is closed to coal prospecting under the Willow Subbasin Area Plan.]

Coal prospecting will occur in a manner that minimizes adverse impacts on the natural environment, including effects on vegetation, water quality, fish, bird, and animal life. Prospecting for coal is allowed adjacent to anadromous fish streams. However, surface entry up to 500 feet from the stream may be restricted if a lease is eventually granted. This policy is limited to the anadromous fish streams on Map 9. Decisions on surface entry adjacent to streams will be made in consultation with the DNR Division of Parks and Outdoor Recreation and DFG.

Mining in community centers. Permits, leasehold stipulations, or other controls affecting subsurface development shall be prepared in consultation with the borough and city governments and be consistent with adopted community comprehensive plans and borough land use plans. The boundaries for community comprehensive plans are defined by the Matanuska-Susitna Borough. Boundaries have not yet been established for community plans in the Willow and Y community council areas, the two councils closest to the Kashwitna Unit. The state shall consider local government recommendations when considering or issuing development leases or permits.

Incorporating plan policies and guidelines into permits and leases. Permits and leases required for mining will continue to be issued on a case-by-case basis coordinated by the DNR Division of Mining, with involvement by DFG, the Department of Environmental Conservation, the DNR divisions of Land and Water, Forestry, and Parks and Outdoor Recreation. Prior to issuing miscellaneous land use permits or leases, the Division of Land and Water will review the management intent, land use designations, and specific management guidelines applying to the area affected by the proposed mining operation and ensure that these considerations are incorporated into the miscellaneous land use permit or lease.

Anadromous fish streams. Overall water and streambed quality necessary to support existing levels of sport, subsistence, and commercial use of anadromous fish within the Kashwitna Unit shall not diminish as a result of mining activities.

Standard stipulations. Permits and lease plans of operations will always address, at minimum, the following issues: timing and methods of access and related impacts, disposal of overburden and tailings, disposal of combustible and noncombustible waste, disposal of sewage and waste water, sediment control, and fuel and oil storage and spills. These are currently applied to all Miscellaneous Land Use Permits issued by the DNR Division of Mining.

Erosion control adjacent to and upland from anadromous fish streams. Stipulations in mining permits or in plans of operations associated with leases will ensure that anadromous fish streams are protected from siltation that may be caused by mining activities. On a case-by-case basis, with the consultation of the DFG, stipulations should be prepared to address

1. location of tailings and overburden,
2. alteration of natural vegetation and natural contours,
3. impacts on non-anadromous fish tributaries that affect water quality downstream,
4. revegetation of disturbed areas, and
5. maintenance of a buffer of undisturbed vegetation adjacent to streams.

Reclamation. The Miscellaneous Land Use Permit or plan of operations associated with a lease will specify that land must be returned to a useful state. The type of reclamation will be determined in consultation with the agency responsible for the primary land use values in the affected area. Reclamation also must comply with AS 29.17 and regulations adopted to implement this statute.

Control of visual impacts. Guidelines will be developed as necessary through the Miscellaneous Land Use Permit or leasing process to minimize the adverse visual impacts of mining in settled areas, recreation areas, and in areas viewed from roads. In such areas guidelines will address, at a minimum, the following items: control of solid wastes; removal of vegetation; siting of mining structures, tailings, and overburden; roads; and rehabilitation of mining sites.

Access for mineral development. The method and timing of access to tundra, wetlands, and other environmentally sensitive areas should minimize damage to these areas. (See also Roads, Trails, and Public Access section in this chapter). Existing roads and trails should be used to provide access to mine sites wherever possible.

WETLANDS

Definition. For purposes of inventory and regulation of wetlands, DNR will use the definition adopted by the State of Alaska under the regulations of the Coastal Management Program (6 AAC 80.900(19)):

> Freshwater wetlands means those environments characterized by rooted vegetation which is partially submerged either continuously or periodically by surface freshwater with less than 0.5 parts per thousand salt content and not exceeding three meters in depth.

For purposes of these management guidelines, wetlands are divided into three classes:

> Class I, wetlands larger than 100 acres and all wetlands with a locatable stream outlet (the stream shall be considered part of the wetland);
>
> Class II, wetlands between 40 and 100 acres with no outlet; and
>
> Class III, wetlands less than 40 acres with no outlet.

Wetlands management. The Army Corps of Engineers regulates all activities that result in discharge or placement of dredged or fill material in wetlands. Corps permits for these activities are reviewed by the Department of Environmental Conservation, DFG, and the Division of Governmental Coordination in the Governor's office. National wetlands policy is currently being reviewed, under the lead of the federal Domestic Policy Council. The State of Alaska, through the Governor's office, is participating in this review.

Wetlands buffers. Wetlands help protect water quality and stabilize water supply, provide important feeding, rearing, nesting, and breeding grounds for wildlife, provide for winter recreation, and add to landscape diversity. Buffers adjacent to wetlands will, to the extent feasible and prudent, protect these important wetland functions. Buffers should include public lands within 100 feet of Class I wetlands or within 60 feet of Class II wetlands. See also Wetlands guideline in the Forestry section of this chapter and Agricultural Development Adjacent to Wetlands in the Agriculture section.

Restrictive use covenants and public access easements. Class I and II wetlands (including outlet streams) and associated buffers should remain in public ownership whenever feasible. Restrictive use covenants and public access easements may be used rather than public ownership under the following conditions:

1. **Where the configuration of the wetland is such that survey along the meander of the wetland would be excessively expensive.** In this case, an aliquot part (rectangular) survey rather than a meander survey may be used along the edge of the wetland. This may result in portions of the wetland being conveyed to private ownership. Restrictive use covenants and public access easements shall be applied to ensure that those portions of the wetland and associated buffer conveyed to private ownership remain in a natural state and that public access and use are maintained.

2. **Where the wetland is entirely included within a parcel of land to be sold for private use.** In this case, the wetland and associated buffer may be conveyed to private ownership with restrictive use covenants which ensure that the wetland and associated buffer remain in a natural state. If there is a stream outlet from such a wetland, public access easements shall also be applied to both the outlet and the wetland.

Chapter 4

Chapter 4

IMPLEMENTATION

Procedures for Plan Modification

The land use designations, policies, implementation actions, and management guidelines of this plan may be changed if conditions warrant. The plan will be updated periodically as new data and new technology become available and as changing social or economic conditions place different demands on state lands.

PERIODIC REVIEW

The plan will be reviewed approximately once every five years to determine if revisions are necessary. An interagency planning team with state and borough representatives will do this review. The guidelines for grazing authorizations and the Willer-Kash Road buffer will be reviewed when the plan is updated. The guidelines may be changed based on research findings or the results of grazing permits and leases offered under the current policy.

TYPES OF CHANGES TO THE PLAN

Three types of changes may be made to a plan: amendments, special exceptions, and minor changes. Amendments and special exceptions are plan revisions subject to the planning process requirements of AS 38.04.065 and the regulations in 11 AAC 55.250; minor changes are not.

Changes to the plan may be proposed by agencies, municipalities, or members of the public. The director of the DNR Division of Land and Water determines what constitutes an amendment, special exception, or a minor change on state land. On borough land, the decision is made by the borough manager.

State regulations for plan modification on state land are being revised. When new regulations are adopted, they will supersede this section and direct plan modification procedures. A plan amendment is not required to incorporate the new procedures. In the interim, the current regulations and additional explanatory sections will guide plan modification. The sections in brackets {} have been included in recently adopted state land use plans, and are being considered for inclusion in the revised regulations.

Plan Amendment

An amendment permanently changes the land use plan by adding to or modifying the basic management intent for one or more of the plan's subunits, or by changing its allowed or prohibited uses, policies, or guidelines. For example, an amendment might close to new mineral entry an area that the plan designated to be open, allow a land use in an area where the plan prohibited it, or allow land to be opened to homestead entry in an area that the plan designated for retention in public ownership (11 AAC 55.030).

Special exception

A special exception does not permanently change the provisions of a land use plan and cannot be used as the basis for a reclassification of the subunit. Instead, it allows a one-time, limited purpose variance of the plan's provisions, without changing the plan's general management intent or guidelines. For example, a special exception might be used to grant an eligible applicant a preference right under AS 38.05.035 to purchase land in a subunit designated for retention in public ownership (11 AAC 55.030).

{Special exceptions may also occur when the proposed activity requires only a small part of a management subunit, does not change or modify the general management intent, and serves to clarify or facilitate the implementation of the plan. An example would be allowing a prohibited use based on more detailed data in a small area on the edge of a management subunit next to a subunit where it is allowed.}

A special exception might be made if complying with the plan would be excessively burdensome or impractical or if compliance would be inequitable to a third party, and if the purposes and spirit of the plan can be achieved despite the exception (11 AAC 55.030).

{A special exception cannot be used to reclassify an area. Special exceptions may apply to prohibited uses or guidelines.}

Minor change

A minor change is not considered a revision under AS 38.04.065. A minor change is a change that does not modify or add to the plan's basic intent, and that serves only to clarify the plan, make it consistent, facilitate its implementation, or make technical corrections. (11 AAC 55.030) The state and borough will provide one another the opportunity to review proposed minor changes.

CHANGES TO THE PLAN ON STATE LAND

Requests for changes on state land should be submitted to the Southcentral Regional Office of the DNR Division of Land and Water.

> {Amendments must be approved by the commissioner. The Department of Natural Resources will convene the planning team as needed to make recommendations on plan amendments.

Procedures for plan amendment.

A. Taking into account the requirements of AS 38.04.065 (b), the commissioner will prepare a written document that specifies:
   - the reasons for the amendment such as changed social or economic conditions;
   - the alternative course of action (what the plan is being changed to); and
   - why the plan amendment is in the best public interest.

B. Where practical, the document should be part of or circulated with a finding required by AS 38.05.035(e).

C. Before making the final decision, the commissioner will request comments and give public notice consistent with AS 38.04.065(b)(8) and 38.05.945 to affected local governments, state and federal agencies, adjacent landowners, and the general public. This notification will include the points described in A above and may be combined with public notice required by applicable permitting procedures. If warranted by the degree of controversy, the commissioner may hold a public meeting before making a decision.

Procedures for special exception

Decisions concerning special exceptions will be made by the director of the Division of Land and Water. The director's decision may be appealed to the commissioner. Special exceptions require public notice and, if appropriate, public meetings. DNR will convene the planning team as needed to make recommendations on special exceptions.

A. Taking into account the requirements of AS 38.04 065(b), the director will prepare a written document that specifies:
   - the reasons for the special exception (why a variance is needed);
   - the alternative action or course of action to be followed;
   - why the special exception is in the best public interest; and
   - how the general intent of the plan and management unit will be met by the alternative course of action.

B. Where practical, the document should be part of or circulated with a finding required by AS 38.05.035(e).

C. Before making the final decision, the commissioner will request comments and give public notice consistent with AS 38.04.065(b)(8) and 38.05.945 to affected local governments, state and federal agencies, adjacent landowners, and the general public. This notification will include the points described in A above and may be combined with public notice required by applicable permitting procedures. If warranted by the degree of controversy, the commissioner may hold a public meeting before making a decision.}

Special exceptions to guidelines modified by "will" or "shall"

Special exceptions to guidelines modified by the word "will" or "shall" may be allowed for individual actions. The decision not to follow a pertinent guideline modified by the term "will" will be consistent with the procedures for special exceptions.

Procedures for minor changes

{Minor changes are made at the discretion of the DNR Division of Land and Water South-central Region manager and do not require public review. Affected agencies will be notified and have an opportunity to comment; the comment period may be provided through existing inter-agency review processes for associated actions. The regional manager's decisions may be appealed to the director. The director's decision may be appealed to the commissioner.}

{Discretion within guidelines

Some policies in the plan, like those modified by the terms "feasible and prudent", "feasible", and "should" are written to allow for exceptions if the conditions described in the policy are met. The definitions of these terms are in the Glossary in Appendix A. The procedures for allowing exceptions to these guidelines are given in this section. Exceptions following these procedures are neither revisions nor changes to the plan.

Guidelines modified by "feasible and prudent" or "feasible"

Exceptions to guidelines modified by the phrase "feasible and prudent" or "feasible" (see definitions in Glossary, Appendix A) may be allowed after the steps outlined below have been taken.

A. The regional manager will prepare a written document that specifies:
   - the conditions that make compliance with the guideline not feasible or not feasible and prudent;

- the alternative course of action to be followed; and
- how the intent of the plan and management unit will be met by the alternative course of action.

B. Where practical, the document should be part of or circulated with a finding required by AS 38.05.035(e).

C. Before making the final decision, the director will give notification required by the applicable permitting procedure and request comments on the proposed action. This notification will include the points described in A above.

Guidelines modified by "should"

Exception to guidelines modified by the word "should" can be made by the DNR Division of Land and Water Southcentral Region manager, or the manager's designees. The guideline does, however, state an intent of the plan that should be met, using the best managerial practices for the given situation. These exceptions require a written justification in the administrative record. The justification should briefly outline how the action meets the intent of the guideline or why the particular circumstances justify deviation from the intended action or conditions. In addition, the manager must ensure that any exceptions do not conflict with the Alaska Coastal Management Plan standards including adopted coastal plans.}

CHANGES TO THE PLAN ON BOROUGH LAND

Amendments to the plan on borough lands must be approved by the Borough Assembly. Amendments require public notice and consultation with affected agencies and may require a public hearing if the Borough Assembly decides a hearing is warranted by the level of controversy. Amendments may be proposed by agencies, municipalities, or the public. Results of the Matanuska-Susitna Borough's comprehensive planning process also may be used as a basis for plan amendment.

Requests for amendments, special exceptions, or minor changes to the plan on borough land are submitted to the Matanuska-Susitna Borough Planning Department.

Amendment to the Willow Subbasin Area Plan

This plan amends the Willow Subbasin Area Plan. It supersedes the Willow plan for the Kashwitna Unit. Public notice that this plan amends the Willow plan was circulated along with public notice for the final Kashwitna Management Plan.

Land Exchanges

To consolidate state and borough ownership and to reduce the need for new permanent roads, the borough and the state will consider exchanging borough land south of Little Willow Creek in T21N R4W section 25 for state land elsewhere in the borough. This exchange is subject to AS 29.65.090.

The state and borough also should consider exchanging land around the lake in T21N R4W sections 1 and 12 to ensure that land is retained in public ownership for a recreation site. Enough land should remain public to provide for camping and picnicking.

Recreation Analysis

The Willer-Kash Road extension (see Route A in the Roads, Trails, and Public Access section of Chapter 3) will cross Little Willow Creek with a permanent bridge. This crossing is likely to increase recreational use of the creek. The creek supports pink, chum, coho, and king salmon, rainbow trout, and grayling. The portion of the creek that crosses the Kashwitna Unit is currently open for fishing under DFG regulations for all these species except king salmon.

The suitability of the creek for boating or floating is not known. The status of resident and anadromous fish stocks in this reach of the creek are also unknown. These factors will largely determine the demand for recreation near the creek crossing, and will affect what facilities are needed. For example, if the river is floatable, a spot to launch canoes or rafts will be needed. If the creek will be a popular sport fishing area, trails may be needed to disperse use along the banks. Parking will be necessary to support either of these activities.

An analysis of the potential for boating, floating, and sport fishing on Little Willow Creek is necessary before the crossing is designed. The analysis will require field checks by the DNR Division of Parks and Outdoor Recreation and DFG. (See guideline on Recreation Analysis for Little Willow Creek Crossing in the Recreation section of Chapter 3.)

Research

GRAZING

The interactions of livestock with wildlife and forest regeneration need field observations and documentation. Grazing permittees and lessees should participate in the process of documenting the effects of grazing in their permit areas. DNR and DFG will identify a specific set of observations and documentation requirements for each permit site as a part of the permit. Grazing research for the Kashwitna Unit should be coordinated with similar research recommended in the Hatcher Pass, Deception Creek, and Matanuska Valley Moose Range management plans.

Moose and livestock food habits and behavior are largely unknown in the Kashwitna Unit, although DFG is learning more about moose habitat distribution. To intensively manage moose, livestock, and vegetation in this area, research is needed on food habits, forage quantity and quality, plant tolerance to utilization, and habitat manipulation.

Range survey. The USDA Soil Conservation Service, in cooperation with DNR and DFG, should conduct a field verified range survey of this area. The survey will analyze forage production and determine the location, quantity, and quality of grazing resources in this unit, and the number of livestock the area will support. In 1990, SCS conducted field research in the Kashwitna area. Vegetation data collected include the site index of principal tree species, current annual production by species of forest understory and non-forested vegetation, and canopy cover by species for major overstory and understory vegetation types. These data are correlated to soil units. Interpretations of soil suitability for forestry, livestock grazing, and wildlife habitat are being developed for the soil survey report.

Food habits and behavior. Information is needed on the year-round locations of moose and summer livestock grazing patterns. Existing information from a study by Compton and Brundage[1] indicate potential for competition between moose and cattle. Food preferences

[1]Compton, T. L., and A. B. Brundage. 1986. Cattle Behavior on subalpine range in southcentral Alaska. J. Animal Science. 32(2):339-342.

must be identified to determine what may be used by both moose and livestock. Moose are known to browse in winter and summer and may also graze to some extent in the summer. Livestock are primarily grazers, but are known to browse. Food items must be identified before one can determine how many animals a range will ultimately support. Information on livestock grazing patterns in other areas should be reviewed and incorporated into research on this unit to the extent applicable.

Forage quantity and quality. The initial stocking rate of a range will be based on quantity of available forage and nutritional value. At different times of the year, lower nutritional levels may be acceptable while at other times, such as prior to calving, higher levels are necessary. Before any new grazing is allowed, DNR will establish control plots within the area to be grazed. Condition and trend plots must also be established to monitor range condition, species composition, and nutrient production.

Tolerance to utilization. Most grazed or browsed plants require utilization to maintain productivity. However, too much can be harmful, and the level at which harm occurs varies by species. Conclusions from studies by DFG in the Kenai National Wildlife Refuge and by Chugach National Forest indicate that willow should not be browsed beyond a 1/4-inch minimum diameter. Sometimes grazing and browsing may change the vegetation composition in an area. This could be either beneficial or detrimental depending on management objectives. For instance, overgrazing grass would be harmful to the grass, but this may reduce competition for the woody species. Hence, browse and forest products may increase. Species-specific studies are necessary to determine the effect of livestock grazing and moose browsing on the main forage species.

Habitat and forest management. The DNR Division of Forestry is planning to manage commercial and personal use cutting in the Kashwitna area to regenerate forests and improve moose browse. In some situations, the major component of the understory is bluejoint reedgrass *(Calamagrostis canadensis)*, a competitive grass with poor nutrient value at the end of the summer unless it has been grazed. A pilot project may be established to determine if different grazing practices after timber harvest would influence competition between grass and browse species, possibly resulting in increased browse and wood products. An analysis of the results of different timber harvesting and regeneration practices and different grazing practices under a variety of physical conditions is necessary.

Moose utilization. The DNR Division of Forestry and the Department of Fish and Game will cooperate to design and conduct research on moose utilization of timber harvest areas.

STREAM BUFFERS

Little research on stream buffers exists for interior Alaska ecosystems. Additional information will help evaluate the effectiveness of stream buffers for maintaining fish and wildlife habitat values. Research should cover the ability of buffers of different widths to stabilize stream banks, provide shade, protect water quality, contribute large woody debris, and provide wildlife cover and food.

FORESTRY AND HABITAT

The Division of Forestry and the Department of Fish and Game are conducting research on the interaction of forestry and habitat in the Susitna Valley. This information will help DOF and DFG design regeneration systems that will benefit moose habitat and ensure prompt reforestation after timber harvesting. Some of this research is occurring in the Kashwitna Area. The Kashwitna Area may be used for future research because of active timber harvesting, high moose populations, and accessiblity.

DOF is currently researching site preparation and regeneration in two research projects adjacent to the Willer-Kash Road (T20N R3W section 30, S.M.). Forty acres was scarified with a clearing blade in the spring of 1989. DOF will monitor birch and white spruce regeneration. A transplant bed with 10,000 1/0 seedlings was established in the summer of 1990. Seedlings included white spruce, siberian larch, and lodgepole pine. These trees will be outplanted in adjacent units of timber sale SC-1255 during 1991 and 1992.

DFG is currently researching

- methods of site preparation after logging that will promote establishment of hardwood seedlings at high densities,
- methods of maintaining early successional forest types to prolong the availability of browse following reforestation,
- effects of browsing on reforestation,
- methods of manipulating black spruce stands to produce hardwood browse,
- seasonal habitat preferences of moose, and
- moose subpopulations, movement patterns, and sources of mortality.

Special Use Area Designation

This plan directs DNR to establish a special use area for the Kashwitna Unit for management of off-road vehicle travel (see Chapter 3, Roads, Trails, and Public Access). The intent of the special use area is to identify routes that can be used by ORVs year-round without causing environmental damage, and routes that will be open for ORV use only with adequate snow cover to protect vegetation. Summer ORV travel will be allowed only on designated routes. When adequate snow cover exists, the entire area will be open to ORV use.

To establish a special use area, DNR, in consultation with DFG and the Matanuska-Susitna Borough should

1. Map existing trails and identify existing public uses.
2. Check trail routes and trail conditions to determine which trails are actively used and which are capable of sustaining summer ORV use. This is best done after moose season, when the effects of peak use can be observed. This should include consultation with user groups to identify high-use areas.
3. Develop recommendations for which trails should be designated summer ORV routes.
4. Develop guidelines for the amount of snow cover required for area-wide ORV use.
5. Notify the public of the intent to establish a special use area, and invite public comment.
6. Establish the special use area and implement its guidelines.
7. Work with user groups to establish and maintain trails.

Current enforcement procedures require slow and costly civil litigation against individuals who violate special use area regulations. The planning team recommends that the legislature grant DNR citation authority to enforce the special use area guidelines. The special use area will not apply to borough lands unless specifically approved by the Matanuska-Susitna Borough Planning Commission and Assembly.

Monitoring and Enforcement

This plan emphasizes multiple use. It relies on existing laws and regulations, new guidelines, and a special use area for ORV travel to make different uses compatible. To make these protect these uses, and to develop public confidence in the state's multiple use management, these measures must be enforced. Examples of actions likely to need field work, monitoring, and enforcement include design of trail and road routes, use of the Willer-Kash Road buffer, timber sales, and grazing permits.

Field staffing and funding are currently inadequate to enforce the laws and guidelines on all state lands. DNR puts a high priority on taking action against unauthorized activities and on monitoring and enforcing compliance with stipulations on leases, permits, and sales where activities are likely to create significant negative impacts on other important resources or uses. DNR's ability to enforce laws and guidelines in the plan depends on its budget. The Department will continue to reflect these priorities for monitoring and enforcement in its budget requests. The planning team recommends that additional funds be dedicated to implementing, monitoring, and enforcing the land management policies in the Kashwitna Unit.

Right-of-Way Reservation

The DNR Division of Land and Water will reserve a 300' right-of-way for the Willer-Kash Road corridor. The 300' width is intended to reserve enough room to locate the road in the field in the best location. After construction, the width will be reduced to 100'.

Forest Practices Act Review

The planning team recommends review of the statutory definition of "sustained yield" (AS 41.17.950) when the Forest Practices Act is reviewed. The review should consider whether or not declining flow should continue to be included in the definition of sustained yield.

Appendices

Appendix A

GLOSSARY

AAC. Alaska Administrative Code.

Anadromous fish stream. Streams identified by DFG in the *Catalog of Anadromous Waters* are anadromous streams. In lieu of site-specific determinations that a stream does or does not contain anadromous fish, it should, for planning purposes, be presumed that a stream is anadromous if it is connected to anadromous waters without DFG-documented physical blockage and has a stream gradient of 8% or less. Where a previous site visit has not been made, DFG will, at the operator's request, conduct a field review to document the presence of anadromous fish. The field review will be scheduled when anadromous fish are likely to be present and the site is accessible.

AS. Alaska Statutes.

Clearcut. An area where all trees are harvested within a cutting unit, and where the cutting unit is 5 acres or greater.

Closed to mineral entry. Areas where staking new mineral claims is prohibited because mining has been determined in conflict with significant surface uses in the area. Valid existing mineral claims at the time of plan adoption are not affected by mineral closures.

Consultation. Under existing statutes, regulations, and procedures, the Department of Natural Resources informs other groups of its intention to take a specific action, and seeks their advice or assistance. Consultation is not intended to be binding on a decision. It informs affected organizations and individuals about forthcoming decisions and gathers their expertise. DNR replies to parties offering advice or assistance by sending them the decision and the reasons for which the decision was made, or by notifying them that the decision and findings are available for review.

Cutting unit. An area within a timber sale from which trees are actually removed. Timber sales include cutting units and unharvested areas.

DEC. Department of Environmental Conservation.

DFG. Alaska Department of Fish and Game.

DNR. Alaska Department of Natural Resources.

DOTPF. Alaska Department of Transportation and Public Facilities.

Due deference. Due deference means that deference which is appropriate in the context of the commenter's expertise and area of responsibility, and all the evidence available to support any factual assertions. (6 AAC 50.120)

Easement. The right to use privately owned land for a particular purpose.

Feasible. Capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, technical, and safety factors (11 AAC 95.900).

Feasible and Prudent. Consistent with sound engineering practice and not causing environmental, social, or economic problems that outweigh the public benefit to be derived from compliance with the guideline (6 AAC 80.900).

Forestry. Where "Forestry" is used as a primary or secondary use designation, it means that multiple use management of the designated lands will include management of forest lands for timber production. The general term "forestry" indicates a broader definition of systematic management of forested lands for timber, water, recreation, wildlife, and other public benefits.

Goal. A statement of basic intent or of a general condition desired in the long term. Goals usually are not quantifiable nor do they have specified dates for achievement.

Group selection cuts. Cuts where all trees are harvested within a cutting unit, and where the cutting unit is less than five acres in size.

Guideline. A specific course of action that must be followed when a resource manager permits, leases, or otherwise authorizes use of state lands. Some guidelines state the intent that must be followed and allow flexibility in achieving it. Guidelines range from giving general guidance for decision-making or identifying factors to consider, to setting detailed standards for on-the-ground decisions.

Harvest unit. One or more cutting units plus the uncut areas between them. The total area of cutting units within a harvest unit is generally 5-50 acres. Harvest units are generally separated by a buffer of at least 330'.

High. A rating given a geographical unit that indicates the relative value of a resource is high compared with other units in the Susitna Basin.

Kashwitna Unit. The area within the Kashwitna Management Plan boundary. The term "Kashwitna area" is used when referring to the general region rather than the plan boundary.

Land sales. Transfer of state land to private ownership as authorized by AS 38.04.010, including fee-simple sale, homesteading, and sale of agricultural rights; they do not include leases, land use permits, water rights, rights-of-way, material sales or other disposals of interest in lands or waters.

Land use designations. Allocations that set out primary and secondary land uses.

Low. A rating given a geographical unit that indicates the relative value of a resource is low compared with other units in the Susitna Basin.

Management intent statement. The statements that define the department's near- and long-term management objectives and the methods to achieve those objectives.

Mining claim and mineral location. The property right to possess and extract all locatable mineral within the boundaries of the location. This right is required by discovery, location, and filing in accordance with the legal requirements of the Alaska Statutes and the Alaska Administrative Code that apply to locatable minerals. The term "mining location" also applies to a prospecting site which does not require a discovery, is acquired by location and filing, and remains in effect for one year.

Moderate. A rating given a geographical unit that indicates the relative value of a resource is moderate compared with other units in the Susitna Basin

Multiple use. The term "multiple use" as defined in the Alaska Forest Resources and Practices Act (A.S. 41.17.950) means:

1. The management of all the various resources of forest land so that they are used in the combination that will best meet the needs of the citizens of Alaska, making the most judicious use of the land for some or all of these resources or related values, benefits, and services over areas large enough to provide sufficient latitude for periodic adjustment in use to conform to changing needs and conditions;
2. That some land will be used for less than all of the resources; and
3. Harmonious and coordinated management of the various resources, each with the other, without significant impairment of the productivity of the land and water, with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output.

Off-highway vehicle or off-road vehicle. A vehicle designed or adapted for cross-country operation over unimproved terrain, ice, or snow, and which has been determined by the Department of Transportation and Public Facilities to be unsuitable for general highway use (13 AAC 40.010).

Policy. An intended course of action or a principle for guiding actions. DNR policies for land and resource management given in this plan include goals, management intent statements, management guidelines, and use designations, implementation plans and procedures and the various other statements of the DNR's intentions.

Primary use. A designated, allowed use of major importance in a particular management unit. Resources in the unit will be managed to encourage, develop or protect this use. Where a management unit has two or more designated primary uses, the management intent statement and guidelines for the unit, together with existing regulations and procedures, will direct how resources are managed to avoid or minimize conflict between these primary uses.

Prohibited use. A use not allowed in a management unit because of conflicts with management intent, designated primary or secondary uses, or management guidelines. Uses not specifically prohibited nor designated as primary or secondary uses in a management unit are allowed if compatible with primary and secondary uses, the management intent statements for the unit, and the plan's guidelines.

Put-to-bed. A process to stabilize and terminate the use of a logging road, trail, or other means of access. Roadbeds may be scarified to encourage revegetation, culverts, bridges, etc., may be removed, final grading is done, water bars may be constructed, barricades may be erected, and in some cases the surface is seeded to reduce erosion.

Remote cabin. Cabin constructed under a permit issued through the Remote Cabin Permit program authorized in AS 38.05.079 and further described in 11 AAC 67.700-.790.

Secondary road. A road constructed and maintained to standards sufficient for timber transportation that provides access to harvest areas. Secondary roads connect spur roads to primary roads.

Secondary use. A designated, allowed use considered important but intended to receive less emphasis than a primary use because it (a)has less potential than a primary use or contributes less to achieving the management intent of the unit than a primary use; or, (b)occurs only on limited sites. In those very site-specific situations where a secondary use has higher value than a primary use, the secondary use may take precedence over the primary use, but only for a limited area of the management unit. Management for a secondary use will recognize and protect primary uses through application of guidelines, regulations, and procedures. However, if a secondary use can not take place without detrimentally affecting a primary use in the management unit as a whole, the secondary use will not be allowed.

Seed-tree harvesting. A harvesting system in which most trees are removed from a stand and openings are created. Openings are similar in size to clearcuts, but about 5-10 of the best mature trees are left standing on each acre to provide a good seed source for forest regeneration.

Selective harvesting. Removal of mature timber, usually the oldest or largest trees, either as single scattered trees or in small groups at relatively short intervals, commonly 5 to 20 years, repeated indefinitely, by means of which the continuous establishment of natural reproduction is encouraged and an uneven-aged stand is maintained. Selective harvesting includes both single-tree selection and group selection.

Shall. Requires a course of action or a set of conditions to be achieved. A guideline modified by the word "shall" is required to be followed by resource managers or users. If a guideline constrained by the term "shall" is not complied with, a written decision justifying the variation is required (see Plan Modification - Chapter 4).

Should. States intent for a course of action or a set of conditions to be achieved. A guideline modified by the word "should" states the intent of the plan and allows a resource manager to use judgment and discretion in deciding either: (a)the specific means for best achieving the intent; or, (b)whether particular circumstances justify deviation from the intended action or set of conditions. A guideline may include criteria for deciding whether such a deviation is justified.

Skid. To pull logs from the stump to the spur road and landing.

Spur road. A road constructed and intended for access within a timber sale. These roads are generally temporary roads less than one mile in length. Spur roads connect the cutting units to secondary (or occasionally primary) roads.

State lands. All lands and resources, including uplands and submerged lands, belonging to or acquired by the State. State patented, tentatively approved, and state selected lands are included in this definition.

Sustained yield. Sustained yield means the achievement and maintenance in perpetuity of a high level of annual or periodic output of the various renewable resources of forest land and water but without significant impairment of the productivity of the land and water, but does not require that timber be harvested in a non-declining yield basis over a rotation period (AS 41.17.950(15)).

Timber sale. One or more harvest units offered for sale under a single contract and described in a Forest Management Report.

USDA. United States Department of Agriculture.

Wetlands. Wetlands includes both freshwater and saltwater wetlands. Freshwater wetlands means those environments characterized by rooted vegetation which is partially submerged either continuously or periodically by surface freshwater with less than .5 parts per thousand salt content and not exceeding three meters in depth. There are no saltwater wetlands in the Kashwitna Unit (6 AAC 80.900).

Class I wetlands are wetlands larger than 100 acres and all wetlands with a locatable stream outlet. *Class II wetlands* are wetlands between 40 and 100 acres with no outlet. *Class III wetlands* are wetlands less than 40 acres with no outlet.

Wildlife concentration area. Areas in which the density of animals exceeds the density of the species in the surrounding area and which are necessary to perpetuate the population.

Will. Used interchangeably with and meaning the same as "shall" (see above).

Year-round road. A road constructed and intended to be used during all seasons of the year.

Appendix B

REFERENCES FOR BACKGROUND INFORMATION

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Appendix C

MAMMALS LIKELY TO OCCUR IN THE KASHWITNA UNIT

Table 1. Mammal species likely to occur in the Kashwitna Management Unit (Sources: Kessel et al. 1982, MacDonald 1980, Youngman 1975, Fuller 1981, Manville and Young 1965, Hall and Kelson 1959).

Insectivora (small insect-eating mammals)	
Masked Shrew	*Sorex cinereus*
Dusky Shrew	*Sorex monticolus*
Water Shrew	*Sorex palustris*
Pygmy Shrew	*Sorex hoyi*
Chiroptera (bats)	
Little Brown Bat	*Myotis lucifugus*
Lagomorpha (rabbits, hares, pika)	
Snowshoe Hare	*Lepus americanus*
Rodentia	
Hoary Marmot	*Marmota caligata*
Arctic Ground Squirrel	*Spermophilus undulatus*
Red Squirrel	*Tamiascurus hudsonicus*
Northern Flying Squirrel	*Glaucomys sabrinus*
Beaver	*Castor canadensis*
Northern Red-backed Vole	*Clethrionomys rutilus*
Meadow Vole	*Microtus pennsylvanicus*
Singing Vole	*Microtus miurus*
Muskrat	*Ondatra zibethicus*
Northern Bog Lemming	*Synaptomys borealis*
Brown Lemming	*Lemmus sibericus*
Meadow Jumping Mouse	*Zapus hudsonius*
Porcupine	*Erethizon dorsatum*
Norway Rat	*Rattus norvesicus*
House Mouse	*Mus musculus*
Carnivora	
Coyote	*Canis latrans*
Wolf	*Canis lupus*
Red Fox	*Vulpes vulpes*

Black Bear	*Ursus americanus*
Brown Bear	*Ursus arctos*
Marten	*Martes americana*
Ermine (short-tailed weasel)	*Mustela erminea*
Least Weasel	*Mustela nivalis*
Mink	*Mustela vison*
Wolverine	*Gulo gulo*
River (Land) Otter	*Lutra canadensis*
Lynx	*Felis lynx*

Artiodactyla

Moose	*Alces alces*

Appendix D

TREATMENT AND MANAGEMENT OF LIVESTOCK DISEASES AND PARASITES

Disease or Parasite	Testing and Treatment before Release on Public Rangeland	Required Action if Animal Tests Disease Positive
Brucella-Tuberculosis	BRT test at least 60 days prior to release	Quarantine; removal from unit; inoculation
Blue tongue	Visual examination by licensed veterinarian at least 60 days prior to release date	Restrict from release on public rangeland for 60 day period to allow retesting and recovery
Anaplasmosis	"	"
Leptospirosis	"	"
Malignant Edema	"	"
Black Leg	"	"
Pateurella	"	"
Parainfluenza III	"	"
Respiratory Syncytial Disease	"	"
Infectious Bovine Rinstracheiti (IBR)	"	"
Contagious Ecthyma	"	"
Equine Infectious Anemia	"	"
Scabies	"	"
Ovine Viral Diarrhea	"	"
Ovine Progressive Pneumonia	"	"
Endoparasites	Visual examination by licensed veterinarian at least 60 days prior to release date Administer by ingestion (Ivermectin or other similar drug) 60 days prior to release date	Restrict from release on public rangeland for 60 day period to allow retesting and recovery

Disease or Parasite	Testing and Treatment before Release on Public Rangeland	Required Action if Animal Tests Disease Positive
Ectoparasites	Visual examination by licensed veterinarian at least 60 days prior to release date Dust and/or spray with appropriate chemicals 60 days prior to release date	Restrict from release on public rangeland for 60 day period to allow retesting and recovery

Appendix E

AMENDMENT TO
WILLOW SUBBASIN AREA PLAN

STATE OF ALASKA

DEPARTMENT OF NATURAL RESOURCES

OFFICE OF THE COMMISSIONER

STEVE COWPER, GOVERNOR

P.O. BOX 107005
ANCHORAGE, ALASKA 99510-7005
PHONE: (907) 561-2020

The Commissioner of the Department of Natural Resources finds that this amendment to the Willow Subbasin Area Plan meets the requirements of AS 38.04.065 and 11 AAC 55.010-.030 for land use plans and hereby adopts the amendment. The Department of Natural Resources will manage state lands in the Kashwitna, Little Willow Creek, and Iron Creek units consistent with this amendment. The Kashwitna Management Plan supersedes the Willow Subbasin area plan within the Kashwitna Unit.

Rod Swope, Commissioner
DEPARTMENT OF NATURAL RESOURCES

October 24, 1990
Date

The Alaska Department of Fish and Game assisted the Department of Natural Resources in preparing the amendment to the Willow Subbasin Area Plan. We appreciate the opportunity to represent fish and wildlife habitat, harvest, and public use values during the development of the amendment. The Department of Fish and Game will use the amendment as guidance when implementing its authorities and when reviewing and commenting on proposed uses of state lands in the Kashwitna, Little Willow Creek, and Iron Creek units.

Don Collinsworth, Commissioner
DEPARTMENT OF FISH AND GAME

11·15·90
Date

AMENDMENT TO WILLOW SUBBASIN AREA PLAN AND RECLASSIFICATION

Description of amendment

The Kashwitna Management Plan amends and supersedes the Willow Subbasin Area Plan within the management plan boundary. In addition, the Willow Subbasin Area Plan is amended to consolidate agricultural homestead areas in the Iron Creek and Little Willow Creek units of the Willow Subbasin Area Plan and the Kashwitna Management Plan. It would change the following designations and classifications (see attached map):

Subunit	Existing Primary Designation	Existing Secondary Designation	Proposed Primary Designation	Proposed Secondary Designation	Acreage
Kashwitna b	Wildlife Habitat Forest	Grazing Pub. Recreation	Agriculture (Kashwitna c)	Wildlife Habitat Forest Grazing	200 ac
Iron Creek b (part)	Wildlife Habitat Water Resources	---	Small Farms (Iron Creek a)	Wildlife Habitat Forest Grazing	1,850 ac
Iron Creek c	Small Farms	Wildilfe Habitat	Wildlife Habitat Water Resources (Iron Creek b)	---	655 ac
Little Willow Creek b	Small Farms	Wildlife Habitat Forest Pub. Recreation	Wildlife Habitat Pub. Recreation (Little Willow Creek a)	Forest	1,275 ac
TOTAL AREA AFFECTED					3,980 ac

Reasons for amendment and reclassification and determination of public interest

This amendment and reclassification is proposed to:

1. Update the Willow Subbasin Area Plan within the Kashwitna Management Plan.
2. Provide more detailed land management intent and guidelines for the Kashwitna Unit.
3. Allow more efficient agricultural development by clustering proposed homestead areas and locating homesteads on better agricultural soils.
4. Decrease the extent of new roads needed to support agricultural development.
5. Widen habitat and recreation buffers along Little Willow Creek.
6. Decrease the amount of farmland adjacent to wetlands.

The amendment in the Kashwitna Unit is in the best public interest because it tailors land management to the specific resources and uses of the area. Specifically, the consolidating the agricultural lands will improve the chance of success of agricultural development on state

land, provide wildlife habitat and recreation opportunities along an important anadromous stream, and reduce the impact of potential development on wetland areas.

Classification Order

Classification Order SC-90-007 will reclassify these lands.

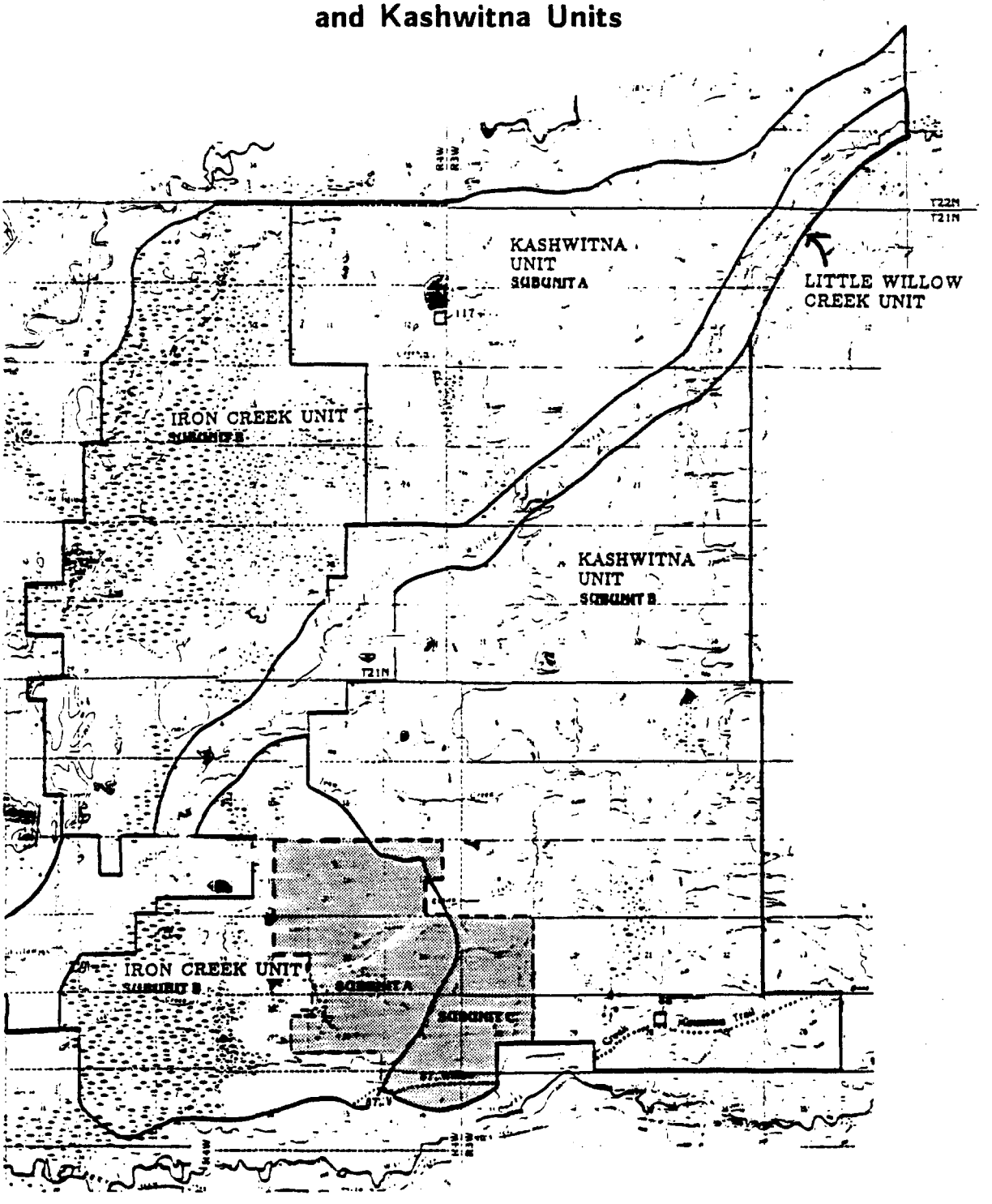
Opportunity for public comment

Public comments on the proposed amendment are welcomed. Comments should be submitted to:

Martha Welbourn
DNR Division of Land and Water
P.O. Box 107005
Anchorage, AK 99510
(907) 762-2660.

All comments must be received by October 12, 1990.

Classifications in Iron Creek, Little Willow Creek, and Kashwitna Units



IRON CREEK	
Subunit A	Agriculture
Subunit B	Water Resources/Wildlife Habitat
LITTLE WILLOW CR.	Public Recreation/Wildlife Haibtat
KASHWITNA	
Subunit A	Forestry/Wildlife Habitat
Subunit B	Forestry/Wildlife Habitat
Subunit C	Agriculture

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